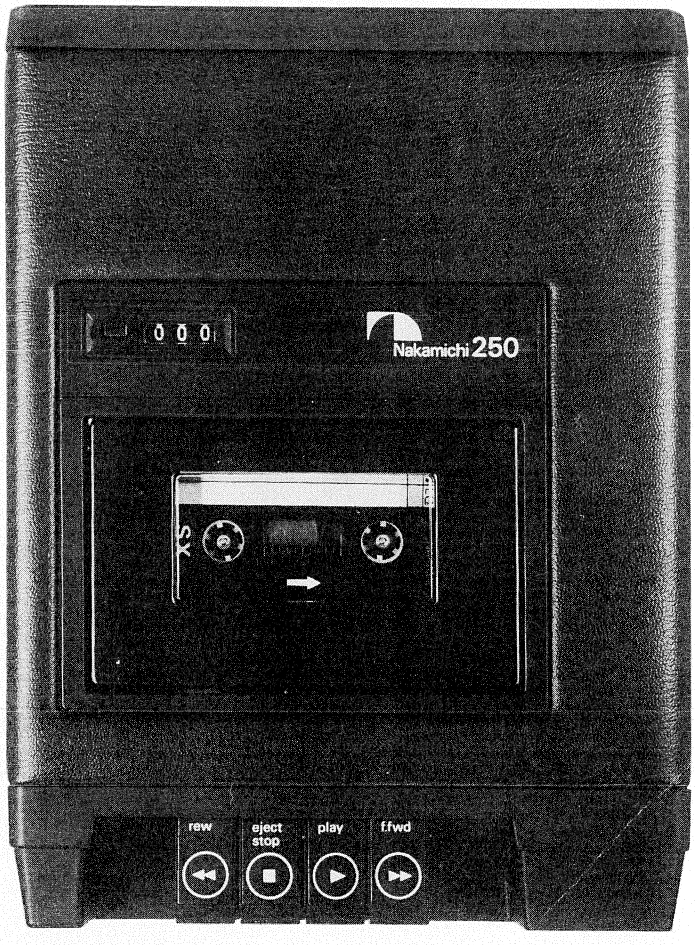
Nakamichi

Service Manual

Nakamichi 250

2 Head Cassette System



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1. GENERAL

Nakamichi 250 control functions are shown below.
To maintain the optimum performance of Nakamichi 250, maintenance such as cleaning of head, capstan shaft and pressure roller, and demagnetization of heads, lubrication, etc. are required.

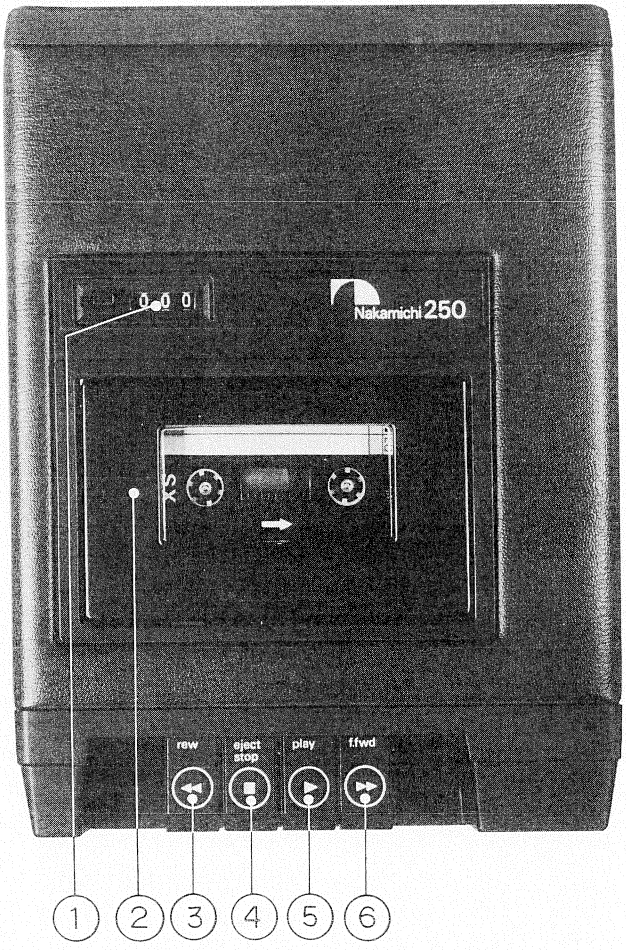


Fig. 1.1

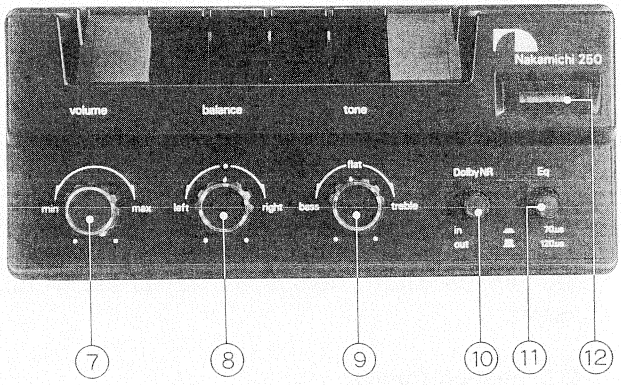


Fig. 1.2

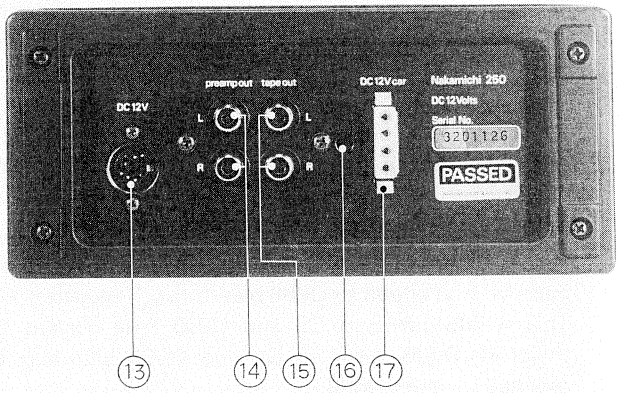


Fig. 1.3

1. Tape Counter
2. Cassette Lid
3. Rewind Button
4. Stop/Eject Button
5. Play Button
6. Fast Forward Button
7. Volume Control
8. Balance Control
9. Tone Control
10. Dolby NR Switch
11. Eq. Switch
12. Power Indicator Lamp
13. DC 12V Jack
14. Preamp. Outputs
15. Tape Outputs
16. For Tape Speed Adjustment
17. 4-Pin DC 12V Car Connector

2. PRINCIPLE OF OPERATION

2.1. Mute Signal

Fig. 2.1 shows the mute circuit and Fig. 2.2 shows the timing chart of mute signal.
When play button is depressed, +12V is supplied to mute circuit, then tape output and preamp. output lines are muted for approximately 2 seconds in order to prevent the transitional noise.

When +12V is supplied to the circuit, a differentiated positive pulse occurs at (a) through capacitor C1.
Therefore current flows into the transistor Q1 base and Q1 turns to On. Accordingly Q2 turns to On.
(b) voltage will become approximately 11.5V therefore Q3 and Q4 turn to On. When the differentiated positive pulse finished to discharge, approximately 2 seconds later Q1 turns to cutoff. Accordingly Q2, Q3 and Q4 turn to cutoff.

2.2. Shut-off Circuit

Fig. 2.3 shows the shut-off circuit and Fig. 2.4 and 2.5 show the timing chart.

(1) Tape End

At a tape end, magnet pulley assembled with tape counter stops. Accordingly reed switch On/Off stops and discharge of the capacitor C602 (synchronizing with the periodic reed switch On/Off) also stops.
Therefore C602 keeps charging and when transistor Q602 base voltage (C602 voltage) becomes positive with respect to the emitter, Q602 turns to On, and then Q603 becomes cutoff.

The voltage of Q603 collector changes from approximately 3.6V to 12V, therefore a differentiated positive pulse will be added to Q605 base through capacitor C607. Then Q605 turns to On and Q606 base current flows therefore Q606 turns to On and Q605 base current is supplied through Q606.
Namely Q605 and Q606 form a memory circuit and when trigger is added to the Q605 base, Q605 and Q606 keep On.

When Q606 turns to On, solenoid is driven by the charge of C604 (2200μF).
As resistance of the solenoid is approximately 12 ohms, the charge of C604 is discharged quickly, though C604 is charged through resistor R610 (330 ohms). When Q606 collector voltage becomes low by the discharge, enough Q605 base current does not flow therefore Q605 will turn to cutoff. Accordingly Q606 will turn to cutoff.

Driven solenoid will mechanically release the play, fast forward or rewind button and 12V DC for the auto shut-off circuit will be cutoff, and Nakamichi 250 will stay in stop mode.

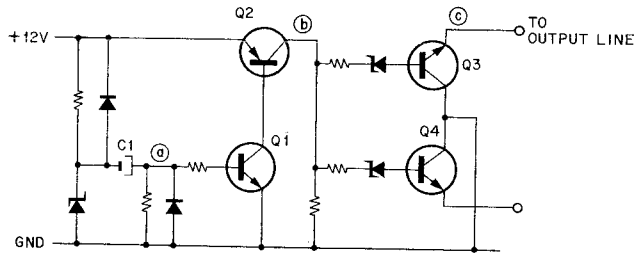
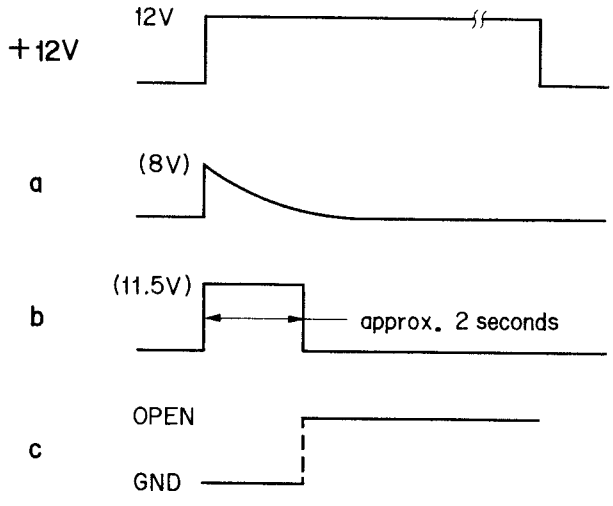


Fig. 2.1



MUTE

Fig. 2.2

(2) External Power Source Cutoff

When external power source is cut off, play or fast forward or rewind mode is released automatically. While in play, fast forward or rewind mode, 12V DC is supplied to the auto shut-off circuit, motor governor and motor. When external power source is cut off, 12V DC discharges so does Capacitor C604.
As C604 discharging time constant is great, transistor Q604 base voltage becomes positive with respect to the emitter.
And Q606 base current flows through Q604 therefore Q606 turns to On. When Q606 turns to On, solenoid is driven by the charge of C604 (2200μF).
Therefore play, fast forward or rewind button will be released.

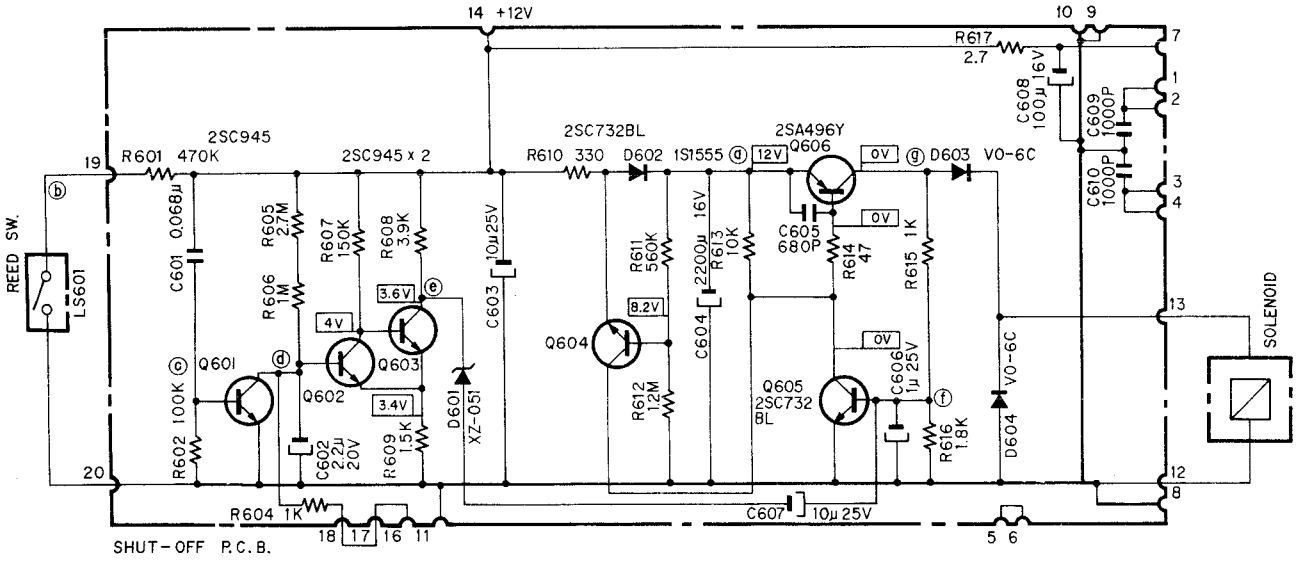
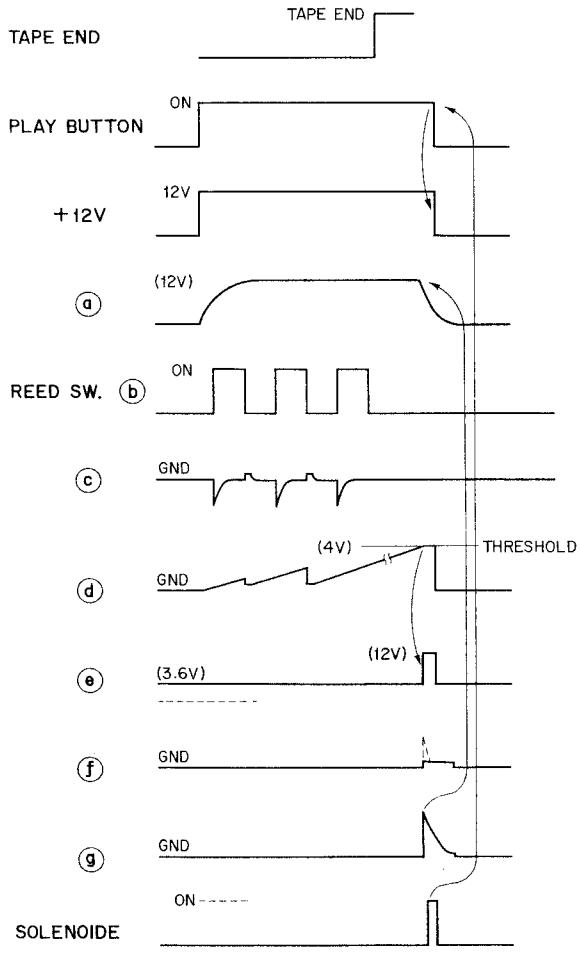
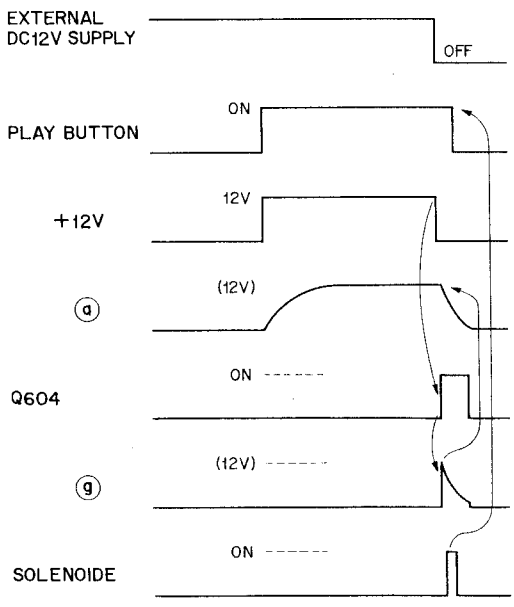


Fig. 2.3



TAPE END

Fig. 2.4



EXTERNAL DC12V SUPPLY OFF

Fig. 2.5

2.3 Tone Control

Fig. 2.6 shows CR network tone control circuit and Fig. 2.7 shows its typical characteristics.

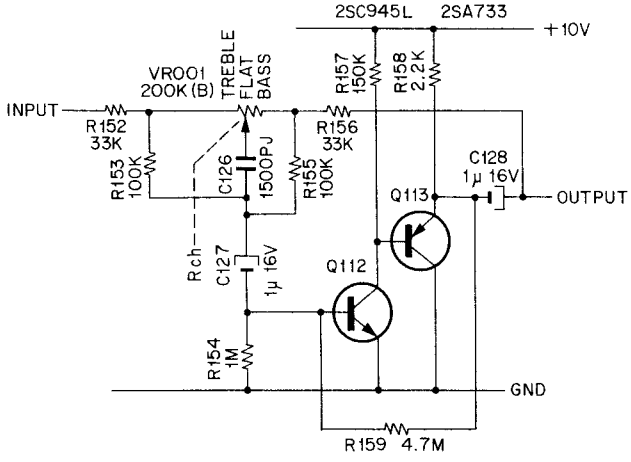


Fig. 2.6

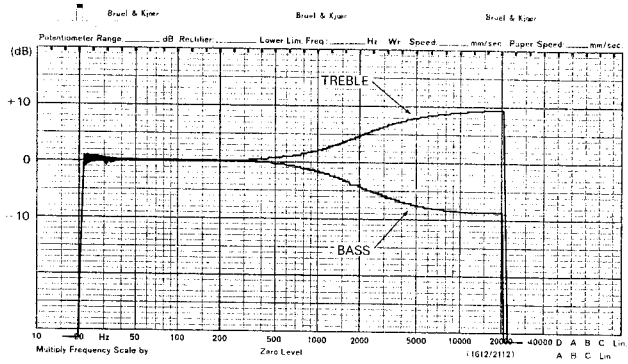


Fig. 2.7

3. REMOVAL PROCEDURES

3.1. Cabinet

Refer to Fig. 3.1 and remove F01 through F14.

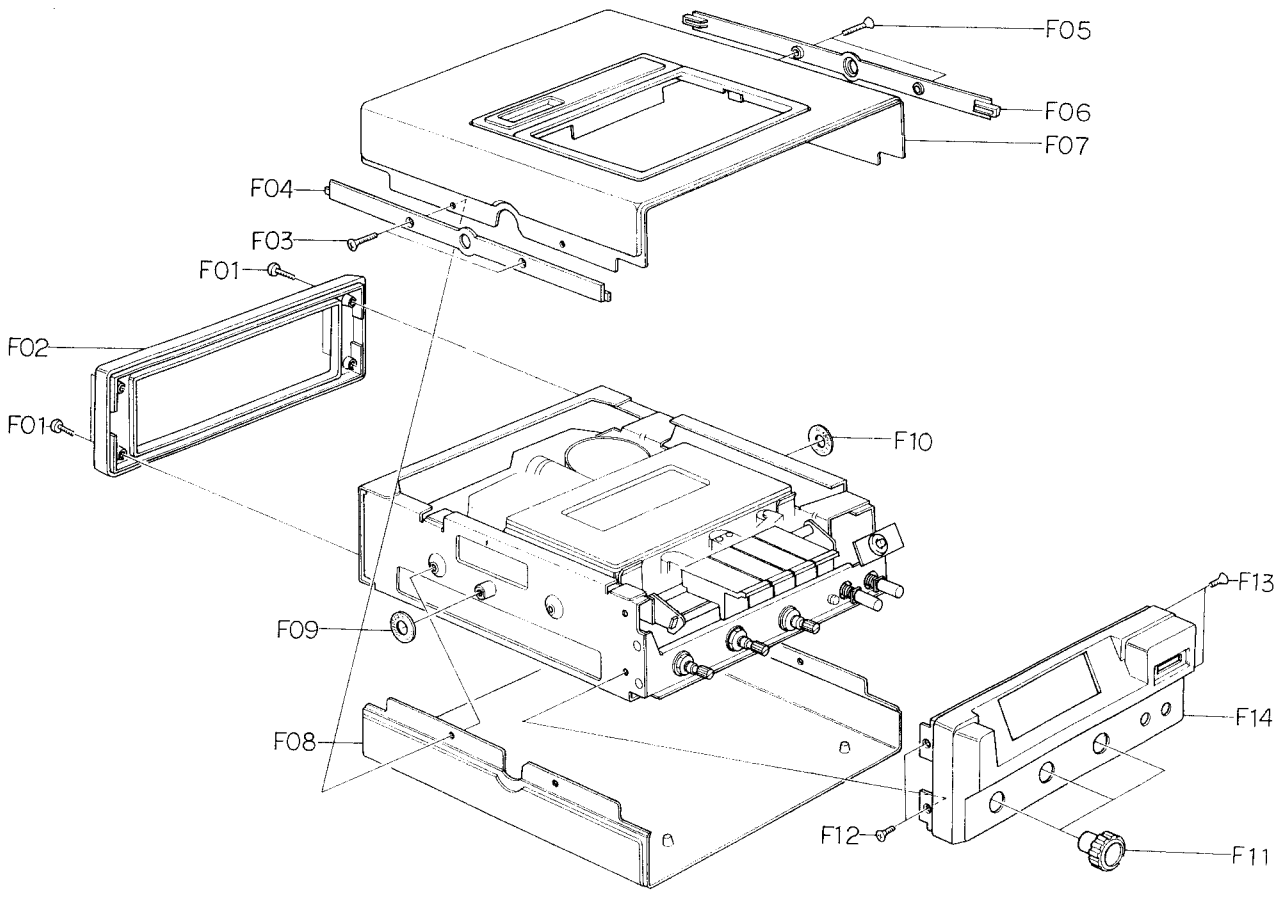


Fig. 3.1

3.2. Playback Head, Dummy Head and Pressure Roller

Remove the cabinet (item 3.1). Refer to Fig. 3.2 and remove F01 through F03 (pressure roller), F04 through F08 (playback head) and F09 through F11 (dummy head).

3.3. Mechanism Ass'y

Remove the cabinet (3.1). Refer to Fig. 3.3 and remove F01 through F06.

3.4. Volume, Balance and Tone Controls, and Switch

Remove the mechanism ass'y (3.3). Refer to Fig. 3.4 and remove F01 through F05 and F06 through F09.

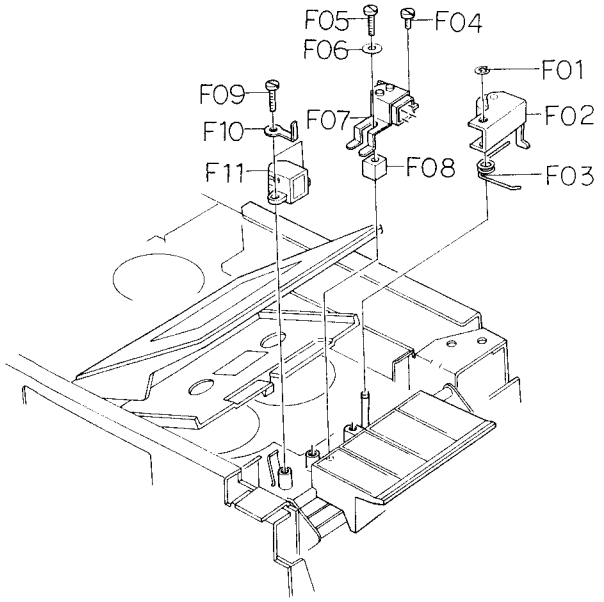


Fig. 3.2

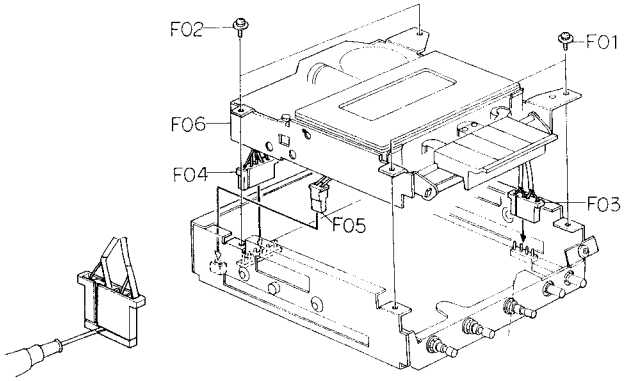


Fig. 3.3

3.5. Jacks

Remove the cabinet (3.1). Refer to Fig. 3.5 and remove F01 through F12.

3.6. Play Switch

Remove the mechanism ass'y (3.3). Refer to Fig. 3.6 and remove F01 through F03.

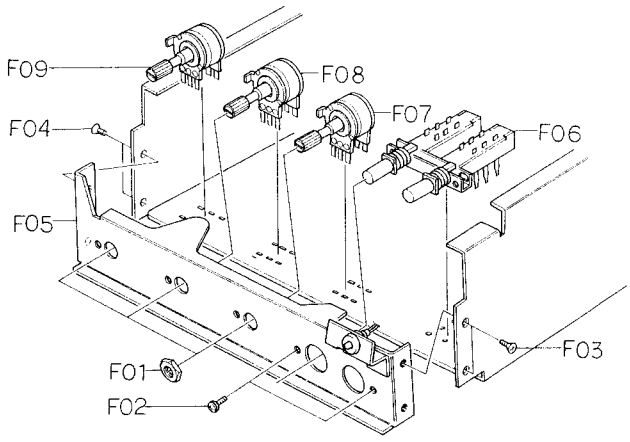


Fig. 3.4

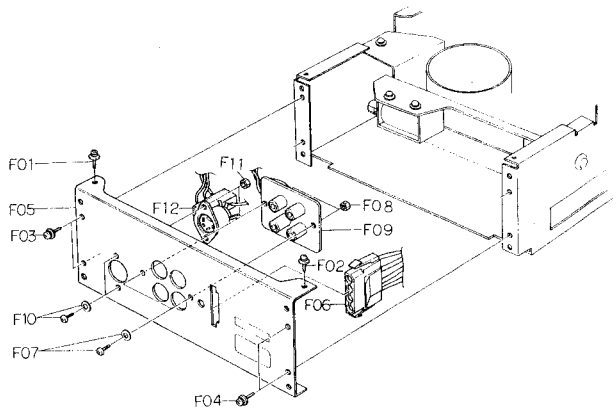


Fig. 3.5

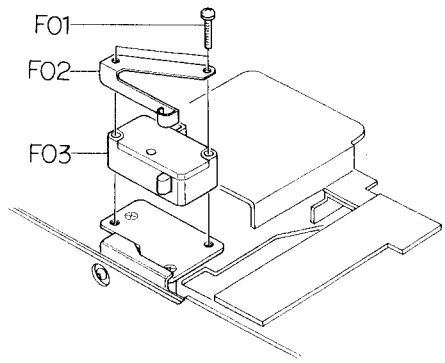


Fig. 3.6

3.7. Button Bracket Ass'y

Remove the mechanism ass'y (3.3). Refer to Fig. 3.7 and remove F01 through F05.

3.8 Solenoid

Remove the mechanism ass'y (3.3). Refer to Fig. 3.8 and remove F01 through F03.

3.9. Motor and Governor

Remove the mechanism ass'y (3.3) Refer to Fig. 3.9 and remove F01 through F03 (governor) and F04 through F13 (motor).

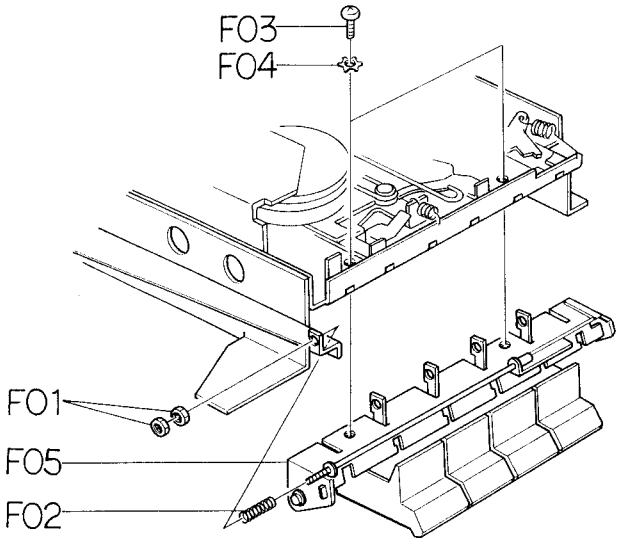


Fig. 3.7

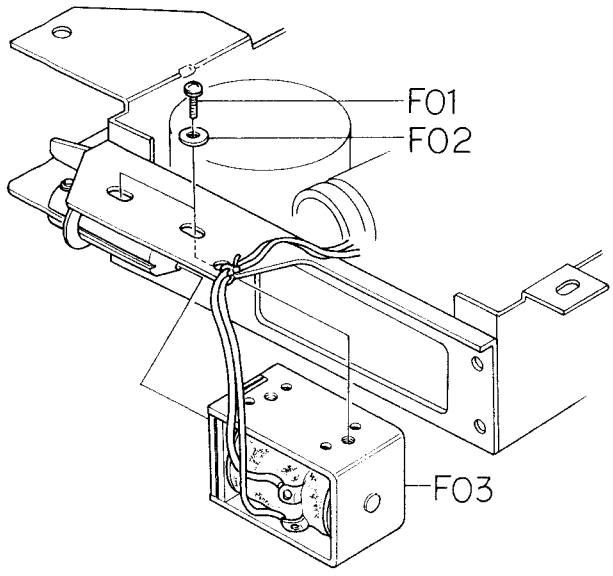


Fig. 3.8

3.10. Flywheel and Idler Pulley

Remove the mechanism ass'y (3.3). Refer to Fig. 3.10 and remove F01 through F06 (flywheel) and F07 through F09 (idler pulley).

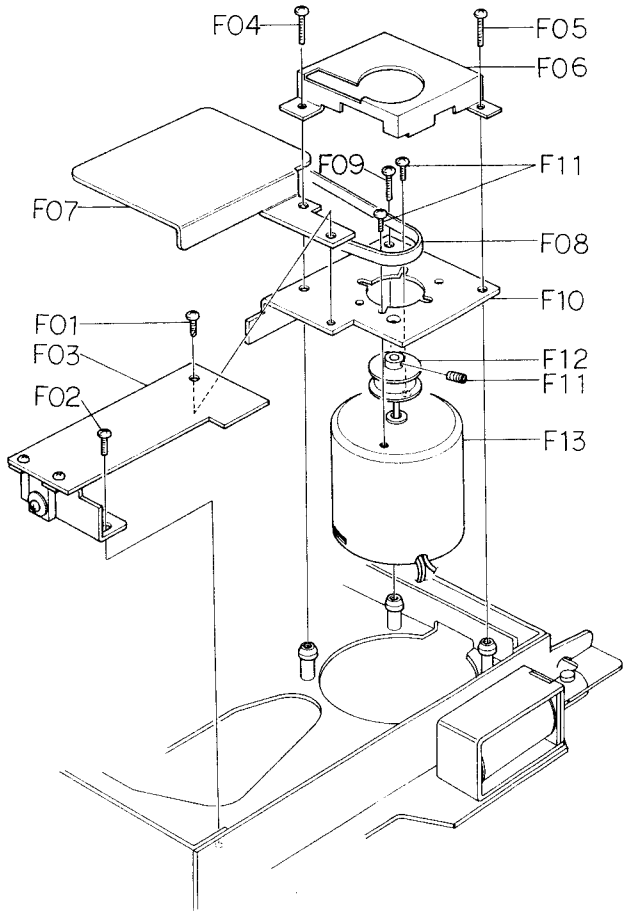


Fig. 3.9

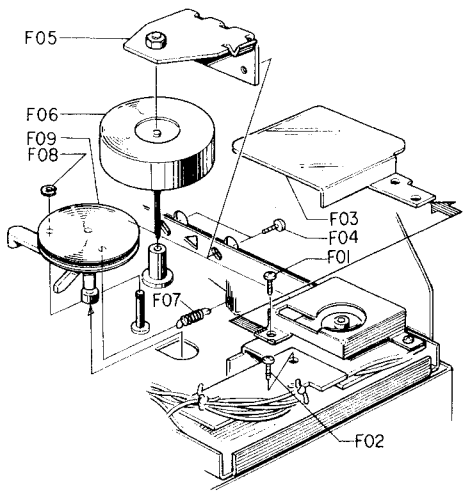


Fig. 3.10

3.11. Counter, Shut-off P.C.B. Ass'y and Reed Switch

Remove the mechanism ass'y (3.3). Refer to Fig. 3.11 and remove F01 through F03 (shut-off P.C.B. ass'y), F04 through F05 (counter) and F06 through F10 (reed switch).

3.12. Cassette Lid and Cassette Well

Remove the mechanism ass'y (3.3). Refer to Fig. 3.12 and remove F01 through F07 (cassette lid) and F08 through F10 (cassette well).

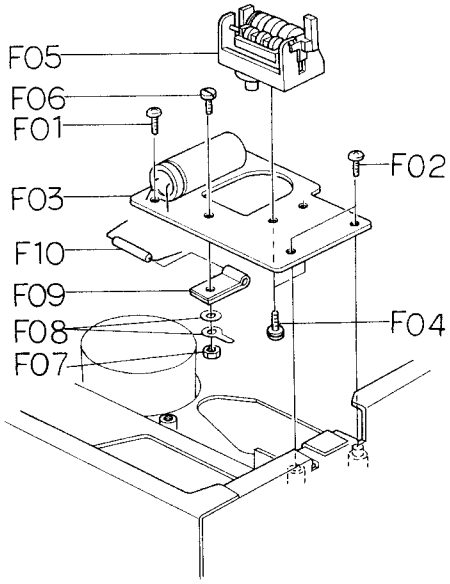


Fig. 3.11

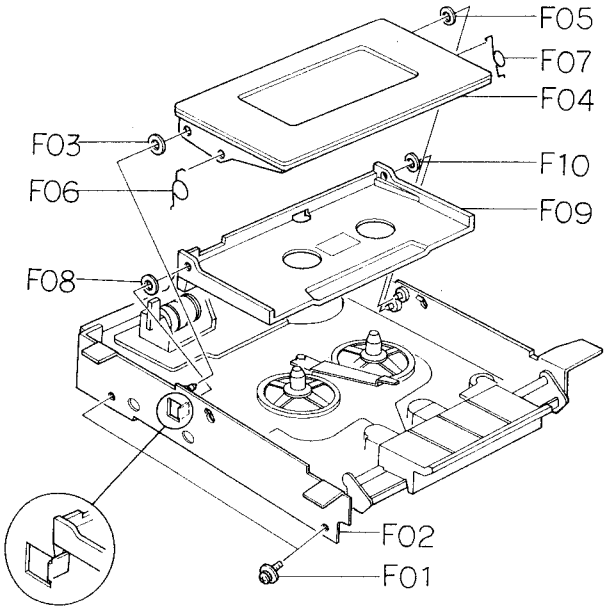


Fig. 3.12

3.13. Take-up Pulley and Supply Pulley

Remove the mechanism ass'y (3.3). Refer to Fig. 3.13 and remove F01 through F04, F05 through F08 (supply pulley) and F09 through F12 (take-up pulley).

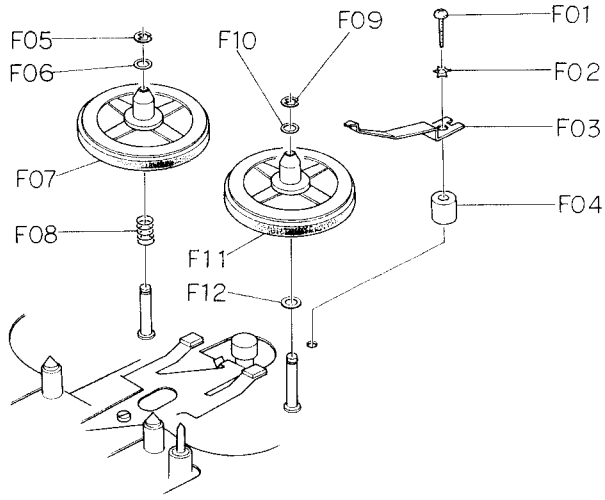


Fig. 3.13

4. MEASUREMENT AND INSTRUMENT

(1) AC Millivolt Meter (with dB measures)
(2) Oscilloscope (DC – 5MHz)
(3) Speed and Wow/Flutter Meter
(4) Frequency Counter (DC – 1MHz)
(5) Ohm Meter
(6) DC Volt Meter
(7) AC Volt Meter
(8) Tape Travelling Cassette B (Part No. DA09027A)
(9) Torque Gauge (DA09013A)
(10) 15KHz Azimuth Tape (DA09004A)
(11) 3KHz Speed & Wow/Flutter Tape (DA09006A)
(12) 1KHz Track Alignment Tape (DA09007A)
(13) 400Hz Level Tape (DA09005A)
(14) 15KHz P.B. Frequency Response Tape (DA09002A)
(15) 10KHz P.B. Frequency Response Tape (DA09003A)
(16) Reference EX Tape (DA09010A)
(17) Reference EXII Tape (DA09021A)
(18) Reference SX Tape (DA09025A)
(19) Track Viewer (DA09012A)
(20) Tape Guide Adjuster (0D09001A)
(21) Information Terminals, Model M-300 (For positioning of playback head)

5. MECHANICAL ADJUSTMENTS

5.1. Take-up Torque and Rewind Torque Adjustment

To adjust torque, move torque plate as shown in the Fig. 5.1. The take-up torque should be 45 ± 10g-cm and rewind torque should be 35 to 60g-cm.

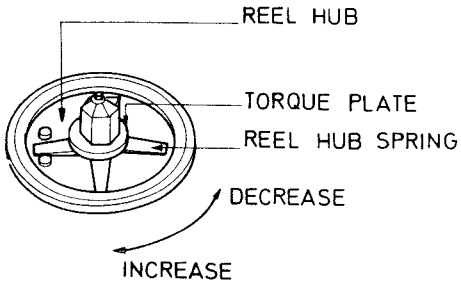


Fig. 5. 1

5.2. Tape Speed Adjustment

(1) Connect a frequency counter to the output jack.
(2) Load the 3KHz Speed Wow Flutter Tape (DA-09006A) and play it back.
(3) Adjust the tape speed adjust potentiometer. See Fig. 5.2.

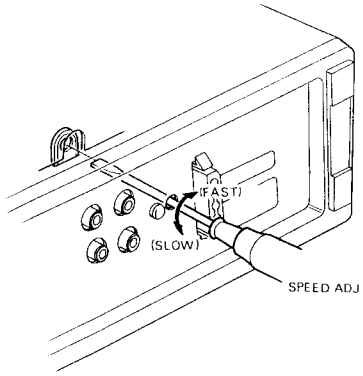


Fig. 5. 2

5.3. Playback Head Height Adjustment and Azimuth Alignment

See Fig. 5.3.

(1) Load the Track Viwer (DA09012A) and check the positions of playback head.
Check to insure that the L-R center of head coincides in position with the middle point between two lines (0.3mm distance) on the track viwer.
(2) If the L-R center deviates from the middle point over 0.2mm. Correct the deviation by adding a head height spacer as illustrated in the item 9.8 (B03).
(3) Connect a VTVM to output jacks.
(4) Load the 1KHz Track Alignment Tape (DA09007A). Insert the Tape Guide Adjuster (OD09001A) into each hole of the tape guide beside the head. Adjust the jig for minimizing each output signal of the right and left channels.
(5) Load the 15KHz Azimuth Tape (DA09004A). Adjust the azimuth alignment screw for maximizing each output signal of the right and left channels. After completion of the adjustment in this step, check the head height as directed in Step (4).

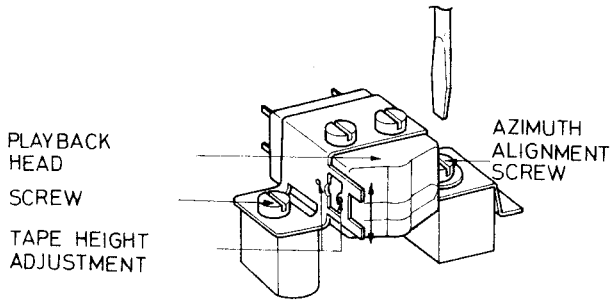


Fig. 5. 3

5.4. Head Base Stroke Adjustment

(1) Remove the mechanism ass'y referring to the item 3.3, mechanism ass'y removal procedure.
(2) Adjust the height of head base stroke adjustment plate as illustrated in Fig. 5.4 (Height Adj.).
(3) Load the "INFORMATION TERMINALS M-300" jig for positioning the record/playback head, pushing backward to eliminate the clearance between reference pin and jig.
(4) Depress the play button and check to insure whether the positioning of the head is within the specified tolerance. If not, adjust the head base stroke adjustment plate from the bottom side at stop mode. See Fig. 5.4 (Stroke Adj.).

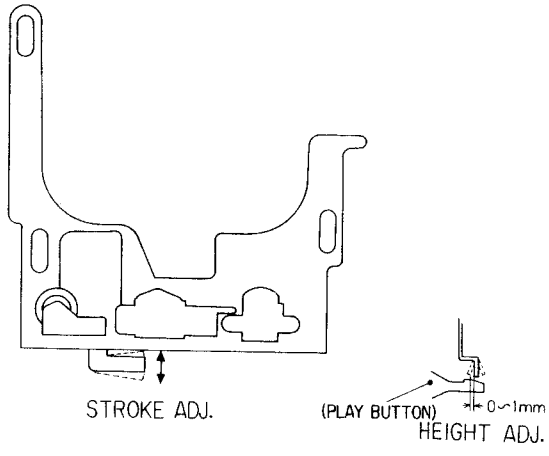


Fig. 5. 4

5.5. Pause Timing Adjustment

This adjustment is required for avoiding the tape spill or tape skip by the inaccurate pause timing.
See Fig. 5.5.

(1) Set to the playback mode without loading the cassette tape.

(2) Depressing the pause button gradually, check to insure the gap between pressure roller and capstan shaft which will be approximately 0.1mm when take-up pulley stops rotation because of changing mode from playback to pause.

(3) In case above is not sufficient, remove the record link ass'y referring to the item 3.16, record link ass'y removal procedure. And adjust the pressure roller as illustrated in the figure.

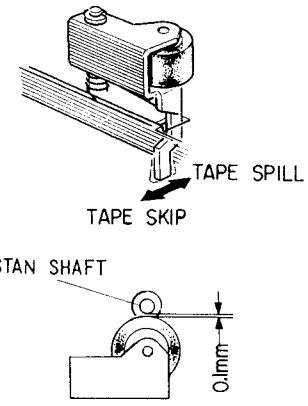


Fig. 5. 5

5.6. Belt Travelling Adjustment

Refer to the Fig. 5.6 and item 3.9, motor and motor governor ass'y removal procedure.

(1) Adjust the motor pulley position and check to insure whether the drive belt is travelling along the correct position and the staying at the correct position, i.e. the center part of motor pulley and the idler pulley without contacting the belt guide at the following modes:
Playback, FF, REW, FF to Stop, REW to Stop

(2) In case motor pulley is tilting, insert spacers into the A, B (when belt slips upward on the motor pulley) or C (when belt slips downward).

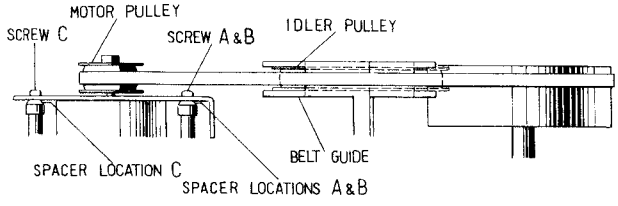


Fig. 5. 6

5.7. Flywheel Adjustment

Refer to the Fig. 5.7 and item 3.1, cabinet removal procedure. Adjust the flywheel clearances should be 0.05 to 0.1mm. After adjustment lock the lock nut.

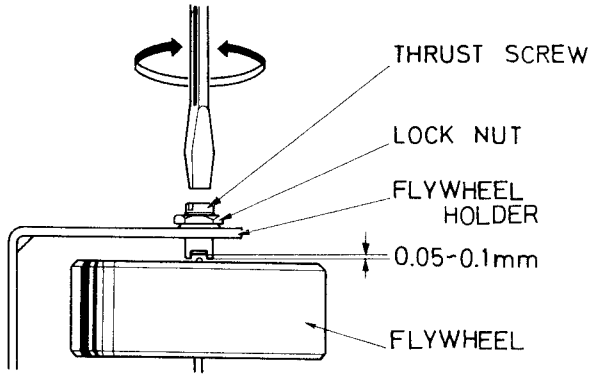


Fig. 5. 7

5.8. Brake Timing Adjustment

Remove the cassette case referring to the item 3.12 cassette lid and cassette well removal procedure.
Refer to the Fig. 5.8.
Loosen screw A, and adjust the contact point between idler pulley and brake to meet each other when control button is depressed and mode is changed from FF to Stop, REW to Stop and Play to Stop.
Fasten screw A and check to insure the gap between idler pulley and brake is approximately within 0.2mm.

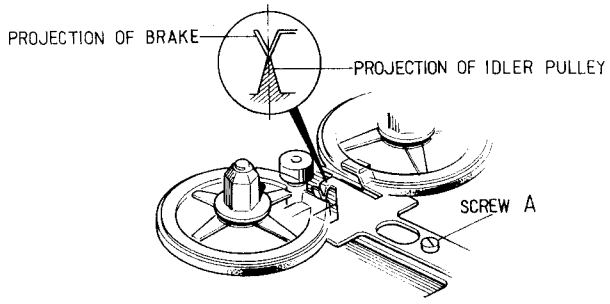


Fig. 5. 8

5.9 Mute Switch and Start Switch Adjustment

See Fig. 5.9. Check the mute switch and start switch movement in the following modes.

(1) Stop
Check to insure the accuracy of gaps of A and B.

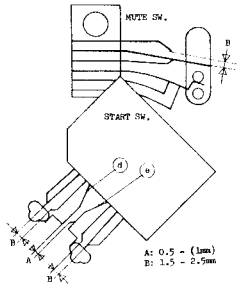
(2) Play
(a) Depress Start
Figure shows the timing when transfer 2-3 or transfer a-b opens.
Check to insure the accuracy of gap of C.
Broken line shows the position of transfer in stop mode.
(b) In the Course of Depress
Check to insure the accuracy of gap of D.
(c) Depress End
Check to insure that the transfer 4-5, 6 will open when gap E becomes more than 0.5mm.
After play button is locked, check to insure the accuracy of gaps E and F.

(3) Fast Forward
Depress the fast forward button and check to insure the same start switch movement as each stage of item (2) "play" as above. While in fast forward mode, mute switch does not work.

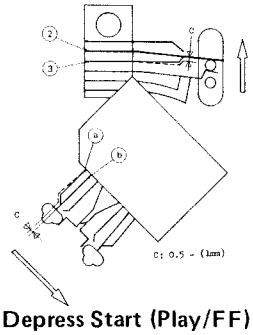
(4) Rewind
(a) Depress Start
Figure shows the timing when transfer g-h opens.
Check to insure the accuracy of gap G. Broken line shows the position of transfer in stop mode.

(b) In the Course of Depress
Check to insure the accuracy of gap H.

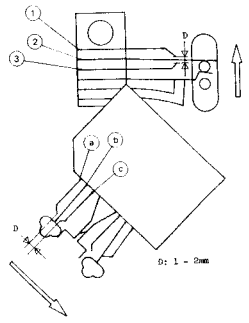
(c) Depress End
After rewind button is locked, check to insure the gap I.



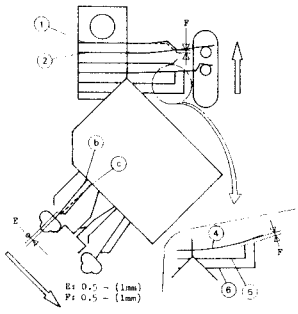
Stop



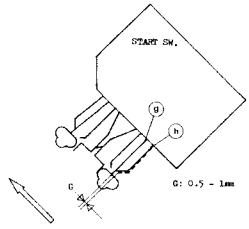
Depress Start (Play/FF)



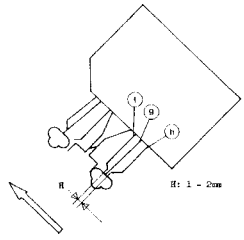
In the Course of Depress (Play/FF)



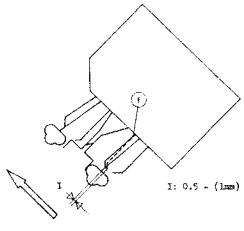
Depress End (Play/FF)



Depress Start (REW)



In the Course of Depress (REW)



Depress End (REW)

Fig. 5.9

5.10. Solenoid Position Adjustment

(1) Remove the mechanism ass'y referring to the item 3.3, mechanism ass'y removal procedure. See Fig. 5.10.
(2) Loosen the screw a little and move the solenoid in the A direction.
(3) Depress the play button.
(4) Holding the solenoid as shown in the figure, slide the solenoid gradually by hand in the B direction.
(5) Then play button will release. Move the solenoid approximately 0.1 to 0.3mm from the released point in the B direction. Fasten the solenoid.
(6) Assemble the mechanism ass'y and turn the power switch on. And check to insure whether the solenoid can be released at the Play, FF and REW modes.

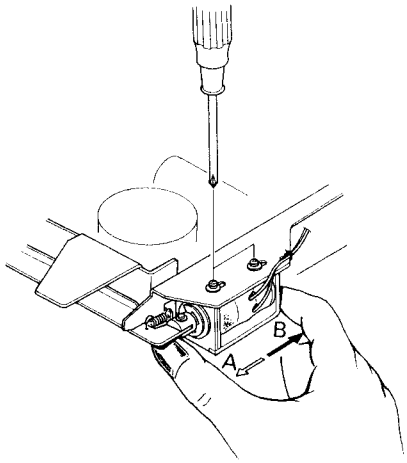


Fig. 5.10

5.11. Tape Travelling Adjustment

Load the Tape Travelling Cassette (DA09027A) and check the following:

(1) After more than 2 second when depressed play button, the tolerance of the tape travelling fluctuation on the record/playback head shall not be more than 0.1mm.
(2) Tape is contact with head sufficiently.
(3) Tape waving is small (on the head and pressure roller).

If tape travelling is not good, re-adjustment of 5.1. "Take-up Torque and Rewind Torque Adjustment", 5.3. "Playback Head Height Adjustment", 5.4. "Head Base Stroke Adjustment" and others will be required.

5.12. Lubrication

After 500 hours of use apply a few drops of light machine oil (LAUNA No. 40) to the pressure roller shaft.

Note: If the lubrication oil is applied also to the capstan shaft and other drive mechanisms, clean it off with an alcohol-dipped cloth.

When flywheel or flywheel holder is replaced apply a few drops of grease to the flywheel holder.

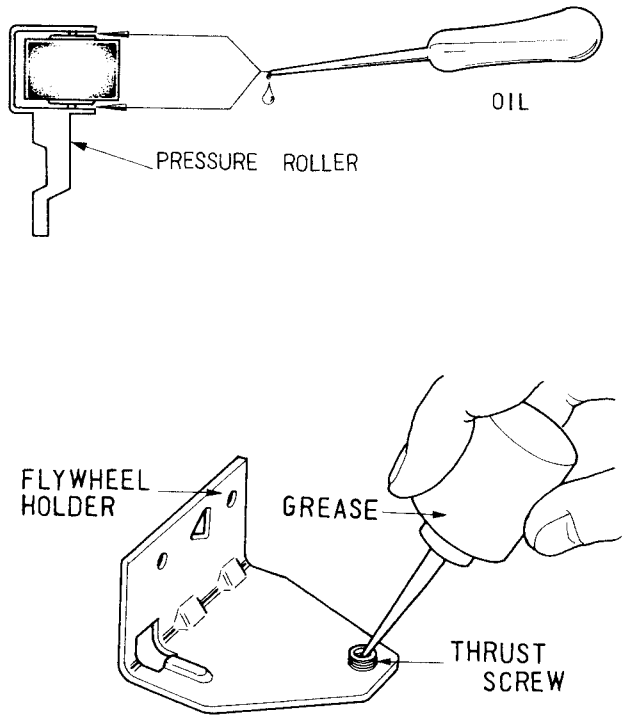


Fig. 5.11

6. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

6.1. Adjustment and Measurement Instructions

Refer to item 7 "Parts Location for Electrical Adjustment", wherein semi-fixed volume and test pin are shown.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUST-MENT	REMARKS
1	Tape Speed	3KHz Speed & Wow/Flutter Tape (DA09006A)	Frequency Counter to TAPE OUT-PUT Jacks	Playback	MHX Governor P.C.B. VR501	Adjust VR501 to obtain 3KHz ±1.5%.
2	Tape Guide Alignment	1KHz Track Alignment Tape (DA09007A)	VTVM to TAPE OUT-PUT jacks	Playback Tape SW.-SX Dolby NR SW.-OUT	Tape Guide of Playback Head	Adjust Tape Guide with Tape Guide Adjuster (0D09001A) to obtain minimum reading of both L and R channels on the VTVM. Refer to item 5.3" Playback Head Hight Adjustment and Azimuth Alignment."
3	Playback Head Azimuth Alignment	15KHz Azimuth Tape (DA09004A)	VTVM to TAPE OUTPUT Jacks	Playback Tape SW.-SX Dolby NR SW.-OUT	Azimuth Align-ment Screw	Adjust the azimuth alignment screw to obtain maximum reading of both L and R channels on the VTVM. Refer to item 5.3 "Playback Head Hight Adjustment and Azimuth Alignment."
4	Playback Level	400Hz Level Tape (DA09005A)	VTVM to TAPE OUTPUT Jacks	Playback Tape SW.-SX Dolby NR SW.-OUT	Main P.C.B. VR101, VR201	Adjust VR101 (VR201) to obtain 580mV on the VTVM.
5	Playback Frequency Response	400Hz Level Tape (DA09005A) 10KHz P.B. Frequency Response Tape (DA09003A) 15KHz P.B. Frequency Response Tape (DA09002A)	VTVM to TAPE OUTPUT Jacks	Playback Tape SW.-SX Dolby NR SW.-OUT		1. Load a 400Hz Level Tape and play it back. Check to insure whether the VTVM indicates 580mV (0dB). 2. Load 10KHz and 15KHz P.B. Frequency Response tapes and adjust the playback head azi-muth to give maximum level on the VTVM with each tape. Check to insure the accuracy of the following frequency response. 10KHz and 15KHz tapes −20dB ±3dB 3. Conduct step 3 "Playback Head Azimuth Alignment". 4. If above is not sufficient adjust the playback peaking level re-ferring to item 6.2 "Playback Frequency Response Adjust-ments".
6	Dolby Circuit	5KHz to Dolby Cir-cuit Input (a)	VTVM to TAPE OUTPUT Jacks	Playback	Main P.C.B. VR102, 103 VR202, 203	Adjust only if circuit is repaired. 1. Turn LAW Control VR102, 202 fully counter-clockwise. 2. Turn GAIN Control VR103, 203 fully counter-clockwise. 3. Set Dolby NR Switch to Out posi-tion and short Test Pin TP101, 201 to ground. 4. Connect a VTVM to tape output jacks. 5. Apply 5KHz signals having a pro-per level to input (a) so that the VTVM may read 44mV at each tape out jacks. 6. Set Dolby NR Switch to In posi-tion and adjust GAIN Controls VR103 and 203, till this signal drops by 10dB on the VTVM. 7. Remove TP101, 201 short, and with Dolby NR Switch In adjust LAW Control VR102, 202 to obtain 17.5mV on the VTVM.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUST-MENT	REMARKS
7	Signal to Noise Ratio	(Without Cassette Tape)	VTVM to TAPE OUTPUT Jacks	Playback Tape SW.-SX Dolby NR SW.-IN		Read the output noise level. 0dB: 580mV Note: The filter of CCITT curve shall be used in the measurement.
8	Wow/ Flutter	3KHz Speed & Wow/Flutter Tape (DA09006A)	Wow/Flutter Meter to TAPE OUT-PUT Jacks	Playback		Playback the tape and read the wow/ flutter meter.

6.2. Playback Frequency Response Adjustment

Fig. 6.1 shows the playback equalization curve for Nakamichi 250, and Fig. 6.2 is the circuit diagram for adjustment.

Playback frequency response adjustment will be required when playback level is not sufficient at 15KHz P.B. Frequency Response Tape (refer to item 6.1.5 "Playback Frequency Response").

Peaking portion compensates the air gap loss of the playback head, and peaking level is varied by the short circuit of R110 (R210) or R111 (R211) as illustrated in the figure.

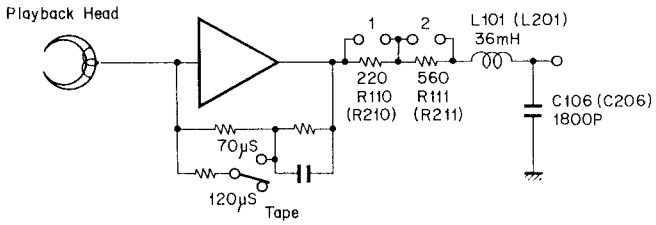


Fig. 6.2

Adjustment:

(1) Playback 15KHz P.B. Frequency Response Tape.

(2) Adjust the R110 (R210) or R111 (R211) (short 1 or 2, or open 1 and 2) to obtain the output level closest to the illustration in the tape label (normally −20dB) on the VTVM.

(3) Adjust the playback head azimuth alignment as illustrated in the item 6.1.3.

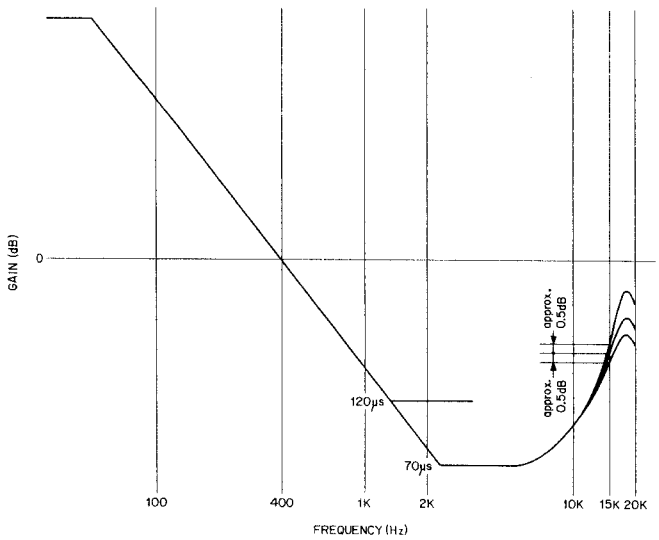
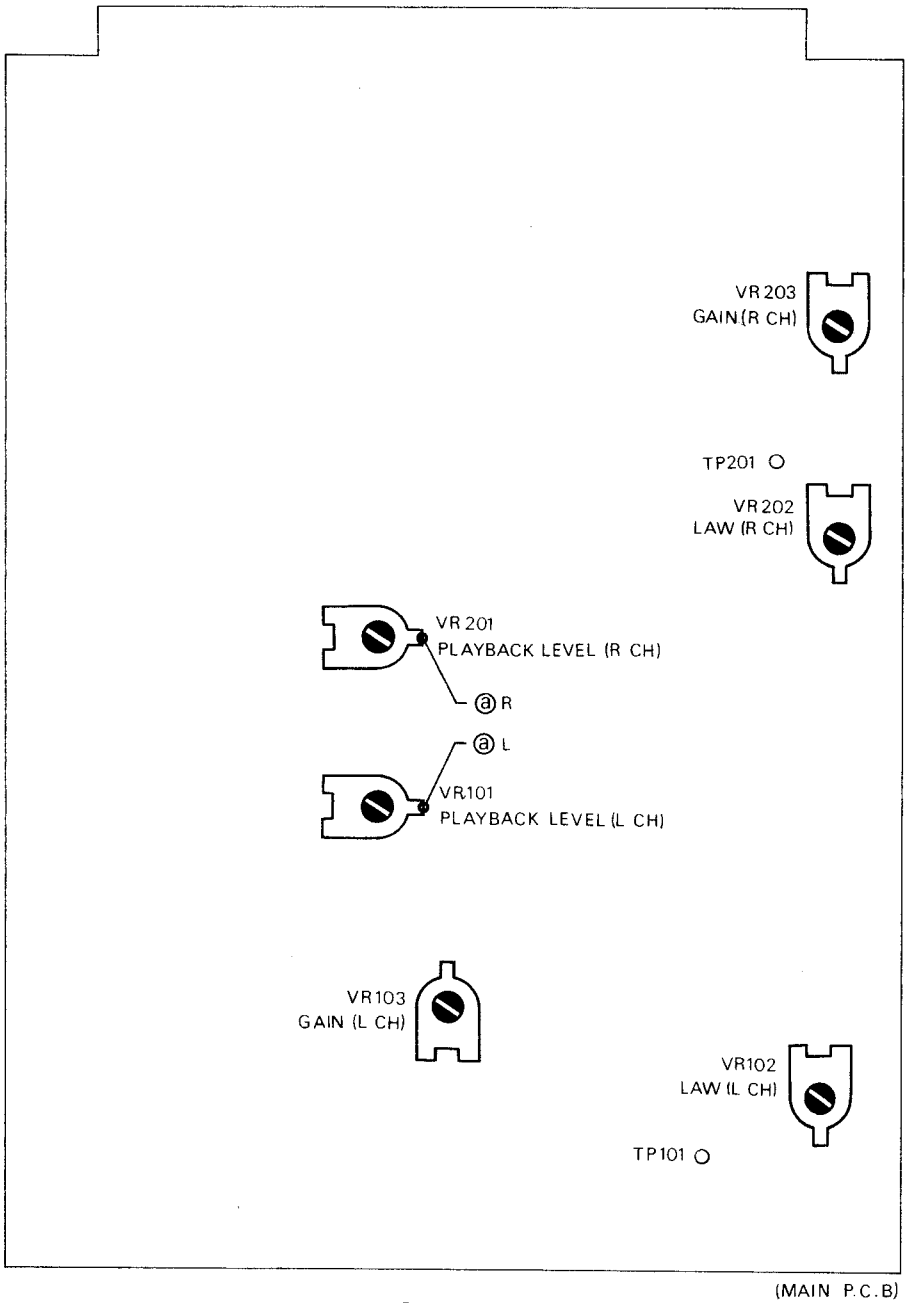
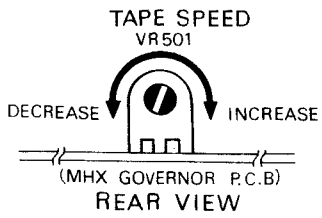


Fig. 6.1

7. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT



BOTTOM VIEW



REAR VIEW

Fig. 7

8. MOUNTING DIAGRAM AND PARTS LIST

Note: Mounting diagram shows a dip side view of the printed circuit board.

8.1. Shut-off P.C.B. Ass'y

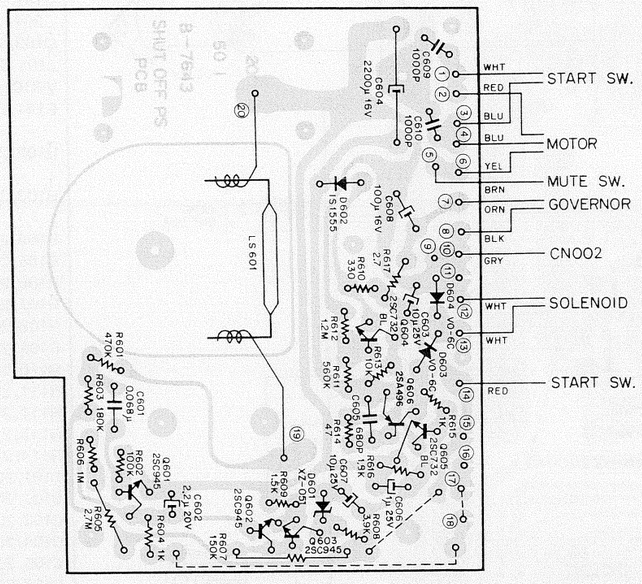


Fig. 8.1

8.2. MHX Governor P.C.B. Ass'y (B)

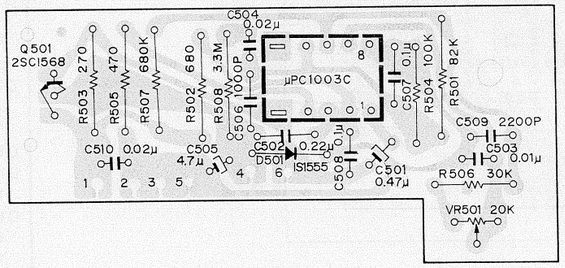


Fig. 8.2

Schematic Ref. No.	Part No.	Description
	BA03767A	**Shut-off P.C.B. Ass'y**
	0B07643A	Shut-off P.C.B.
Q601, 602 603	0B01872A	Transistor 2SC945 (L)
Q604, 605	0B06005A	Transistor 2SC732 (BL)
Q606	0B01695A	Transistor 2SA496 (Y)
D601	0B06048A	Zener Diode XZ-051
D602	0B01909A	Silicon Diode 1S1555
D603, 604	0B01501A	Silicon Diode V0-6C
R601	0B05700A	Carbon Resistor 470K ELR¼ J
R602	0B01920A	Carbon Resistor 100K ELR¼ J
R603	0B05669A	Carbon Resistor 180K ELR¼ J
R604, 615	0B01781A	Carbon Resistor 1K ELR¼ J
R605	0B05753A	Carbon Resistor 2.7M ELR¼ J
R606	0B05564A	Carbon Resistor 1M ELR¼ J
R607	0B05593A	Carbon Resistor 150K ELR¼ J
R608	0B05664A	Carbon Resistor 3.9K ELR¼ J
R609	0B05505A	Carbon Resistor 1.5K ELR¼ J
R610	0B01789A	Carbon Resistor 330 ELR¼ J
R611	0B05665A	Carbon Resistor 560K ELR¼ J
R612	0B05537A	Carbon Resistor 1.2M ELR¼ J
R613	0B01833A	Carbon Resistor 10K ELR¼ J
R614	0B05569A	Carbon Resistor 47 ELR¼ J
R616	0B01830A	Carbon Resistor 1.8K ELR¼ J
R617	0B05836A	Carbon Resistor 2.7 ELR¼ J
C601	0B05586A	Mylar Capacitor 0.068μ 50V K
C602	0B05598A	Tantalum Capacitor 2.2μ 20V
C603, 607	0B01674A	Electrolytic Capacitor 10μ 25V
C604	0B01406A	Electrolytic Capacitor 2200μ 16V
C605	0T04027A	Ceramic Capacitor 680P 50V
C606	0B01173A	Electrolytic Capacitor 1μ 25V
C608	0B01400A	Electrolytic Capacitor 100μ 16V
C609, 610	0T04025A	Ceramic Capacitor 1000P 50V
LS601	0B03803A	Reed Switch
	0C03763A	Reed Switch Holder
	CA03247A	Tape Counter Ass'y
	0E00130A	Earth lug 2.6mm
	0E00149A	Washer 2.3mm
	0E00176A	Nut Hex M2
	0E00185A	Screw M2x6 Cylinder Head
	0E00612A	Screw M3x6 Philips Pan Head (2A) (2pcs.)
	0B08204A	**MHX Governor P.C.B. Ass'y (B)**

8.3. Main P.C.B. Ass'y

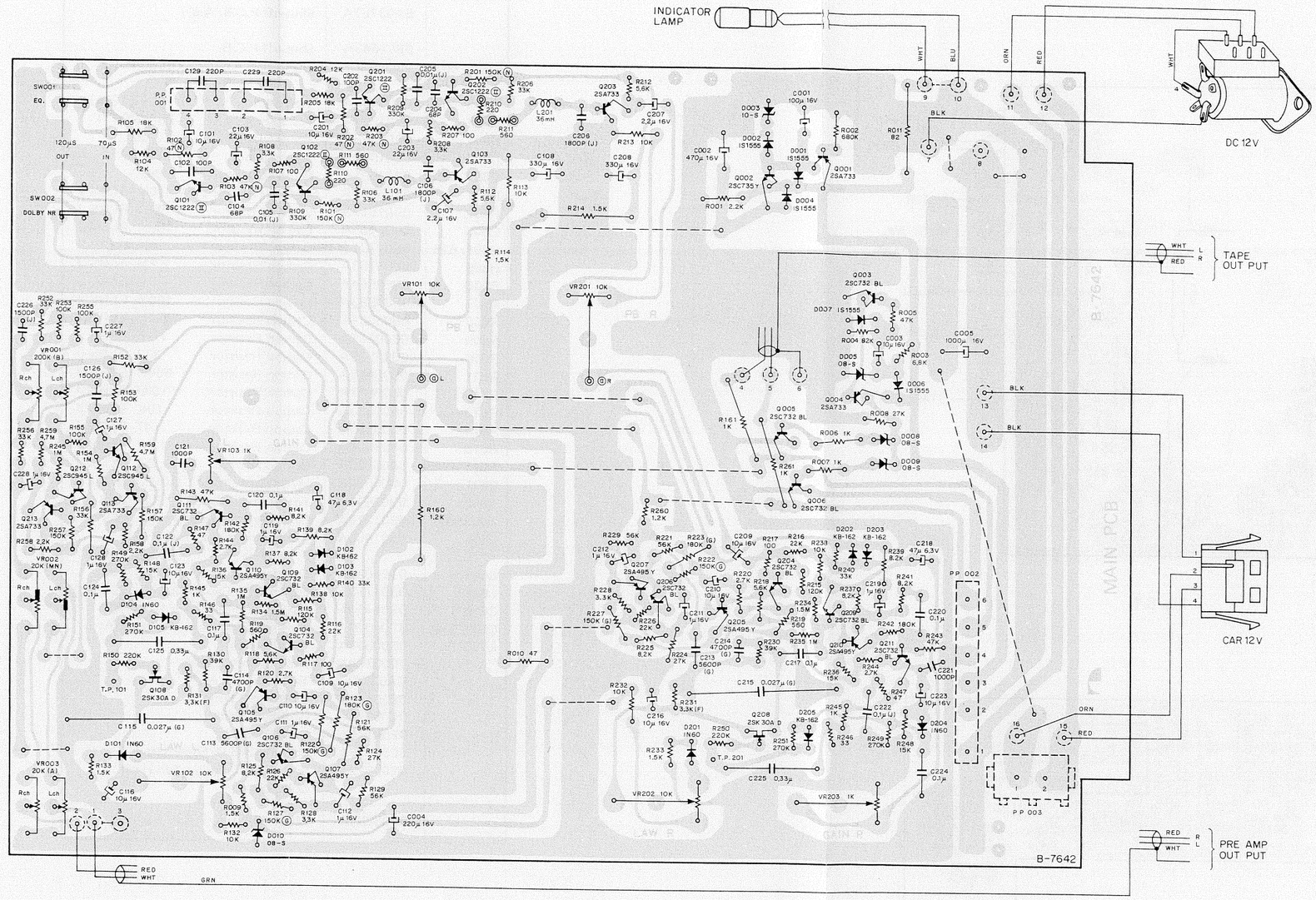


Fig. 8.3

Schematic Ref. No.	Part No.	Description	
	BA03765A	MAIN P.C.B. Ass'y	
	– PRE AMP.–		
Q101, 102 201, 202	0B06062A	Transistor	2SC1222 (2)
Q103, 203	0B06013A	Transistor	2SA733
L101, 201	0B03919A	Inductor	36mH
VR101,201	0B01595A	Semi-fixed Volume	10K
R101, 201	0B05594A	Carbon Resistor (Noiseless)	150K ELR¼ J
R102, 202	0B05850A	Carbon Resistor (Noiseless)	47 ELR¼ J
R103, 203	0B05851A	Carbon Resistor (Noiseless)	47K ELR¼ J
R104, 204	0B05650A	Carbon Resistor	12K ELR¼ J
R105, 205	0B05561A	Carbon Resistor	18K ELR¼ J
R106, 206	0B01879A	Carbon Resistor	33K ELR¼ J
R107, 207	0B05558A	Carbon Resistor	100 ELR¼ J
R108, 208	0B01793A	Carbon Resistor	3.3K ELR¼ J
R109, 209	0B01921A	Carbon Resistor	330K ELR¼ J
R110, 210	0B05608A	Carbon Resistor	220 ELR¼ J
R111, 211	0B05678A	Carbon Resistor	560 ELR¼ J
R112, 212	0B05673A	Carbon Resistor	5.6K ELR¼ J
R113, 213	0B01833A	Carbon Resistor	10K ELR¼ J
R114, 214	0B05698A	Carbon Resistor	1.5K R¼ J
C101, 201	0B01412A	Electrolytic Capacitor	10μ 16V
C102, 202	0B01288A	Ceramic Capacitor	100P 50V
C103, 203	0B01862A	Electrolytic Capacitor	22μ 16V
C104, 204	0B05525A	Ceramic Capacitor	68P 50V
C105, 205	0B05681A	Mylar Capacitor	0.01μ 50V J
C106, 206	0B01913A	Mylar Capacitor	1800P 50V J
C107, 207	0B05512A	Electrolytic Capacitor	2.2μ 16V
C108, 208	0B01502A	Electrolytic Capacitor	330μ 16V
C129, 229	0B01289A	Ceramic Capacitor	220P 50V
	– DOLBY CIRCUIT–		
Q104, 204 106, 206 109, 209 111, 211	0B06005A	Transistor	2SC732 (BL)
Q105, 205 107, 207 110, 210	0B06006A	Transistor	2SA495 (Y)
Q108, 208	0B06001A	FET	2SK30A (D)
D101, 201 104, 204	0B00030A	Germanium Diode	1N60 (P)
D102, 202 103, 203 105, 205	0B01599A	Silicon Diode	KB-162
D010	0B06004A	Zener Diode	08-S
VR102,202	0B01595A	Semi-fixed Volume	10K
VR103,203	0B01866A	Semi-fixed Volume	1K
R009 133, 233	0B05505A	Carbon Resistor	1.5K ELR¼ J
R010 147, 247	0B05569A	Carbon Resistor	47 ELR¼ J
R115, 215	0B05568A	Carbon Resistor	120K ELR¼ J
R116, 216 126, 226	0B05661A	Carbon Resistor	22K ELR¼ J
R117, 217	0B05558A	Carbon Resistor	100 ELR¼ J
R118, 218	0B05673A	Carbon Resistor	5.6K ELR¼ J
R119, 219	0B05678A	Carbon Resistor	560 ELR¼ J

Schematic Ref. No.	Part No.	Description
R120, 220 144, 244	0B01782A	Carbon Resistor 2.7K ELR¼ J
R121, 221 129, 229	0B05563A	Carbon Resistor 56K ELR¼ J
R122, 222 127, 227	0B01859A	Carbon Resistor 150K RD¼ G
R123, 223	0B01590A	Carbon Resistor 180K RD¼ G
R124, 224	0B05538A	Carbon Resistor 27K ELR¼ J
R125, 225 137, 237 139, 239 141, 241	0B01878A	Carbon Resistor 8.2K ELR¼ J
R128, 228	0B01793A	Carbon Resistor 3.3K ELR¼ J
R130, 230	0B01885A	Carbon Resistor 39K ELR¼ J
R131, 231	0B01585A	Carbon Resistor 3.3K EL¼ F
R132, 232 138, 238	0B01833A	Carbon Resistor 10K ELR¼ J
R134, 234	0B05601A	Carbon Resistor 1.5M ELR¼ J
R135, 235	0B05564A	Carbon Resistor 1M ELR¼ J
R136, 236 148, 248	0B05591A	Carbon Resistor 15K ELR¼ J
R140, 240	0B01879A	Carbon Resistor 33K ELR¼ J
R142, 242	0B05669A	Carbon Resistor 180K ELR¼ J
R143, 243	0B05562A	Carbon Resistor 47K ELR¼ J
R145, 245	0B01781A	Carbon Resistor 1K ELR¼ J
R146, 246	0B05567A	Carbon Resistor 33 ELR¼ J
R149, 249 151, 251	0B05600A	Carbon Resistor 270K ELR¼ J
R150, 250	0B05596A	Carbon Resistor 220K ELR¼ J
C004	0B01398A	Electrolytic Capacitor 220μ 16V
C109, 209 110, 210 116, 216 123, 223	0B01412A	Electrolytic Capacitor 10μ 16V
C111, 211 112, 212 119, 219	0B01405A	Electrolytic Capacitor 1μ 16V
C113, 213	0B01864A	PP Capacitor 5600P 50V G
C114, 214	0B01608A	PP Capacitor 4700P 50V G
C115, 215	0B01892A	PP Capacitor 0.027μ 50V G
C117, 217 120, 220 124, 224	0B01603A	Mylar Capacitor 0.1μ 50V K
C118, 218	0B01404A	Electrolytic Capacitor 47μ 6.3V
C121, 221	0B04059A	Mylar Capacitor 1000P 50V K
C122, 222	0B01780A	Mylar Capacitor 0.1μ 50V J
C125, 225	0B01602A	Mylar Capacitor 0.33μ 50V K
TP101,201	0B03924A	FET Gate Pin
	–TONE AMP.–	
Q112, 212	0B01872A	Transistor 2SC945 (L)
Q113, 213	0B06013A	Transistor 2SA733
R152, 252 156, 256	0B01879A	Carbon Resistor 33K ELR¼ J
R153, 253 155, 255	0B01920A	Carbon Resistor 100K ELR¼ J
R154, 254	0B05564A	Carbon Resistor 1M ELR¼ J
R157, 257	0B05593A	Carbon Resistor 150K ELR¼ J
R158, 258	0B05566A	Carbon Resistor 2.2K ELR¼ J
R159, 259	0B05824A	Carbon Resistor 4.7M ELR¼ J
R160, 260	0B05623A	Carbon Resistor 1.2K R¼ J
R161, 261	0B01857A	Carbon Resistor 1K R¼ J

Schematic Ref. No.	Part No.	Description
C126, 226	0B05653A	Mylar Capacitor 1500P 50V J
C127, 227 128, 228	0B01405A	Electrolytic Capacitor 1μ 16V
	–MUTE–	
Q003, 005 006	0B06005A	Transistor 2SC732 (BL)
Q004	0B06013A	Transistor 2SA733
D005, 008 009	0B06004A	Zener Diode 08-S
D006, 007	0B01909A	Silicon Diode 1S1555
R003	0B01877A	Carbon Resistor 6.8K ELR¼ J
R004	0B01564A	Carbon Resistor 82K ELR¼ J
R005	0B05562A	Carbon Resistor 47K ELR¼ J
R006, 007	0B01781A	Carbon Resistor 1K ELR¼ J
R008	0B05538A	Carbon Resistor 27K ELR¼ J
C003	0B01412A	Electrolytic Capacitor 10μ 16V
	–DC SUPPLY–	
Q001	0B06013A	Transistor 2SA733
Q002	0B01338A	Transistor 2SC735 (Y)
D001, 002 004	0B01909A	Silicon Diode 1S1555
D003	0B06073A	Zener Diode 10-S
R001	0B05566A	Carbon Resistor 2.2K ELR¼ J
R002	0B05597A	Carbon Resistor 680K ELR¼ J
R011	0B05503A	Carbon Resistor 82 ELR¼ J
C001	0B01400A	Electrolytic Capacitor 100μ 16V
C002	0B01392A	Electrolytic Capacitor 470μ 16V
	–MISCELLANEOUS–	
	0B07642A	Main P.C.B.
PP001	0B08127A	4P Plug Pin
PP002	0B08169A	6P Plug Pin
PP003	0B08167A	2P Plug
VR001	0B07111A	Volume 200K (B)
VR002	0B07113A	Volume 20K (MN)
VR003	0B07112A	Volume 20K (A)
	0J03429A	Front Chassis N250
	0B07114A	Push Switch 22
C005	0B01397A	Electrolytic Capacitor 1000μ 16V

9. MECHANISM ASS'Y AND PARTS LIST

9.1. Synthesis (A01)

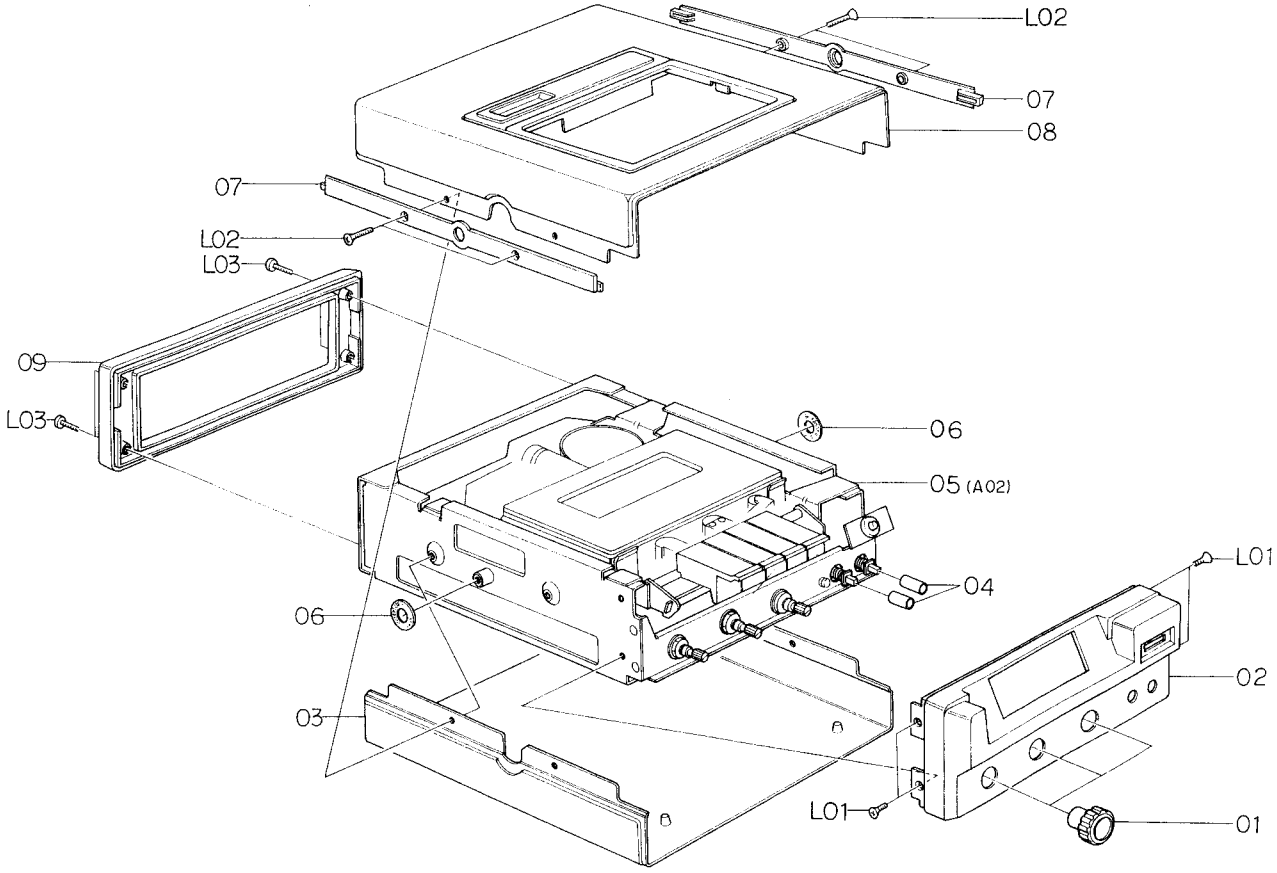


Fig. 9.1

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
A01		**Synthesis**		**A02**	**JA03091A**	**Chassis Ass'y 250**	1
01	0H03425A	VR Knob (B)	3	01	0B01431A	Gum Bush	1
02	HA03642A	Front Cabinet Ass'y	1	02	0J03433A	Lamp Holder	1
03	HA03648A	Bottom Case Ass'y	1	03	0B03884A	Pilot Lamp	1
04	0H03426A	Push Switch Button	2	04	JA03087A	Front Chassis 250 Ass'y	1
05	JA03091A	Chassis Ass'y 250	1	05	JA03086A	Side Chassis R Ass'y	1
06	0J03476A	Soft washer	2	06	JA03085A	Side Chassis L Ass'y	1
07	0H03423A	Side Cover	2	07	JA03088A	Rear Chassis 250 Ass'y	1
08	HA03647A	Upper Case 250 Ass'y	1	08	CA03293A	Mechanism Ass'y 250	1
09	0A03259A	Rear Cabinet	1	09	0M03564A	REW. Plate	1
L01	0E00505A	Screw M3x6 Philips Counter-sunk Head	4	10	0M03565A	Stop Plate	1
				11	0M03645A	Play Plate	1
L02	0E00599A	Screw M3x10 Philips Oval Counter Head (Bronze)	4	12	0M03567A	F.F. Plate	1
L03	0E00703A	Screw M3x14 Philips Pan Head (Bronze)	4	L01	0E00612A	Screw M3x6 Philips Pan Head (2A)	1
				L02	0E00602A	Screw M3x4 Philips Counter-sunk Head	4
				L03	0E00606A	Screw M3x6 Philips Pan Head (3A)	10

9.2. Chassis Ass'y 250 (A02)

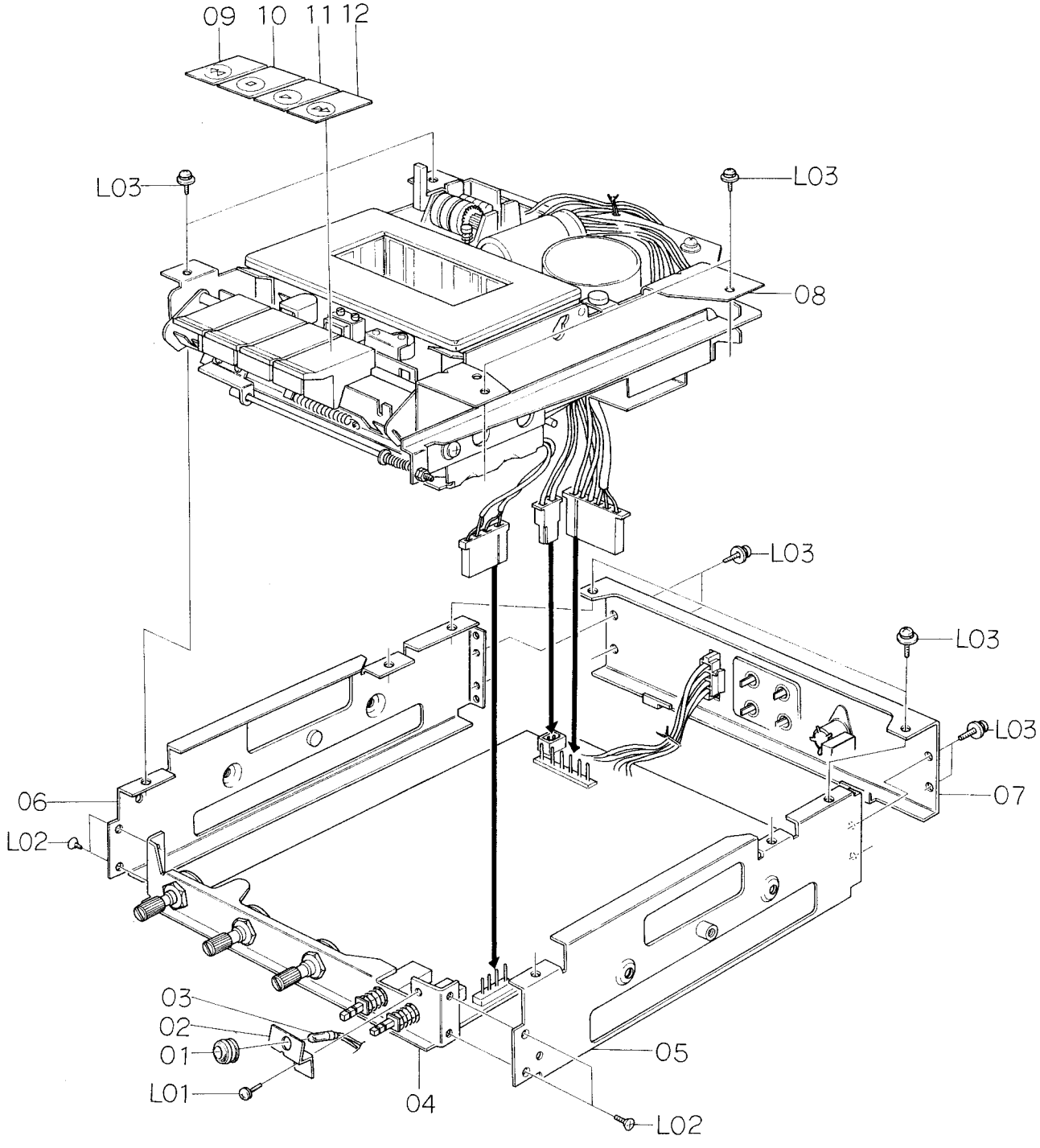


Fig. 9.2

9.3. Rear Chassis Ass'y 250 (A03)

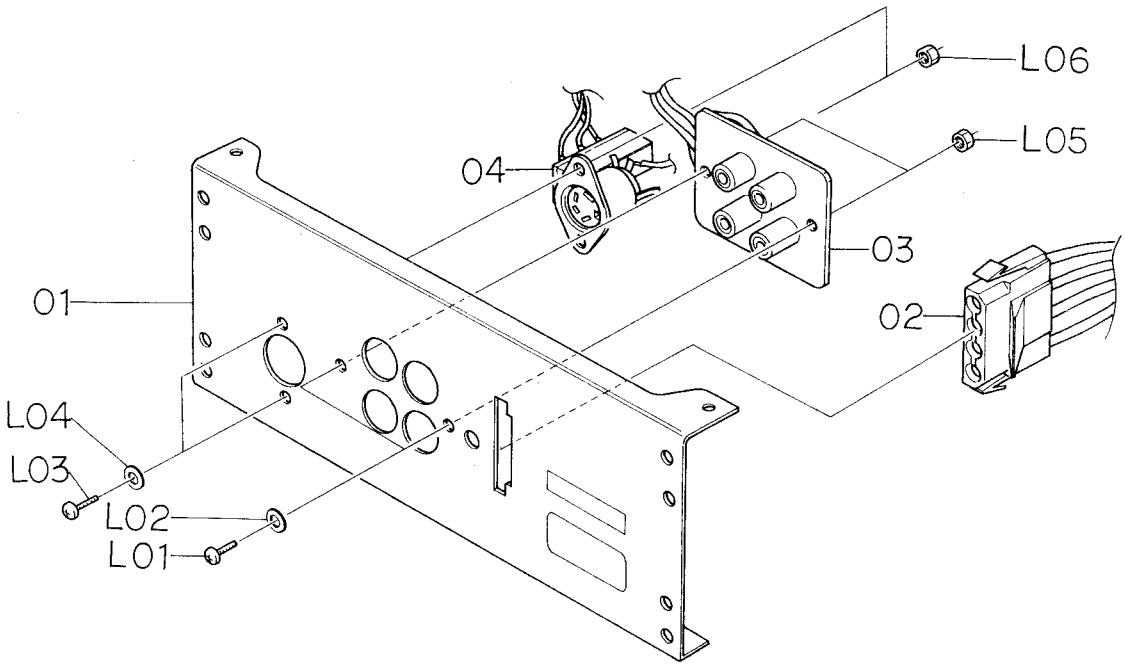


Fig. 9.3

9.4. Front Chassis Ass'y 250 (A04)

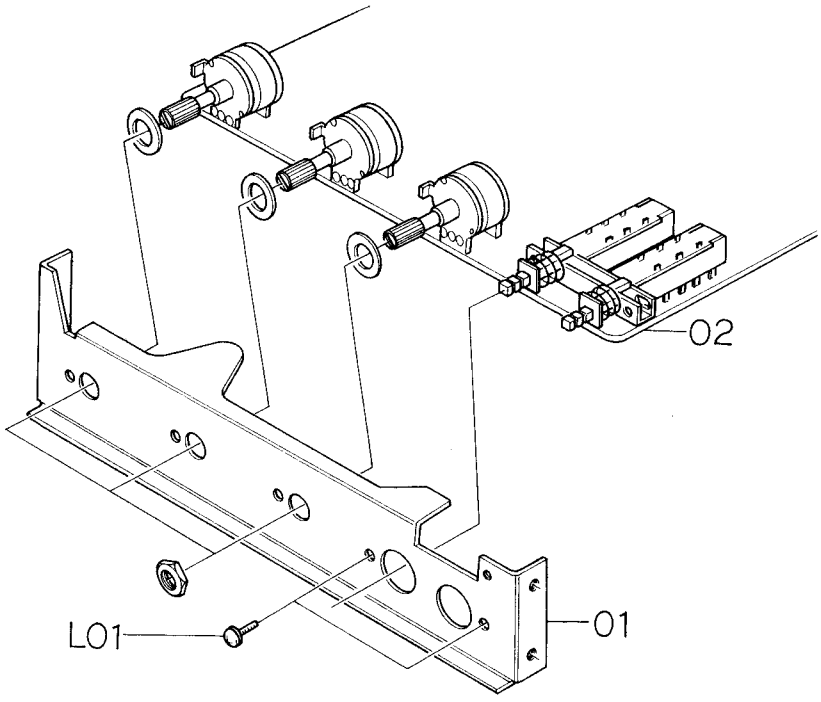


Fig. 9.4

Schematic Ref. No.	Part No.	Description	Q'ty
A03	**JA03088A**	**Rear Chassis 250 Ass'y**	1
01	0J03428A	Rear Chassis 250	1
02	0B08224A	4P Mini-Connector Jack	1
03	0B08171A	4P Pin Jack	1
04	0B08135A	4P Din Jack	1
L01	0E00588A	Screw M3x8 Philips Pan Head (Bronze)	2
L02	0E00677A	Washer 3mm Plastics (Black)	2
L03	0E00715A	Screw M2.6x6 Philips Pan Head (Bronze)	2
L04	0E00651A	Washer 2.6mm Plastics (Black)	2
L05	0E00552A	Nut Hex M3	2
L06	0E00681A	Nut Hex M2.6	2
A04	**JA03087A**	**Front Chassis 250 Ass'y**	1
01	0J03429B	Front Chassis 250	1
02	BA03765A	Main P.C.B. Ass'y	1
L01	0E00612A	M3x6 Philips Pan Head (2A)	2

9.5. Mechanism Ass'y 250

9.5.1. Mechanism Ass'y 250 (A05-1)

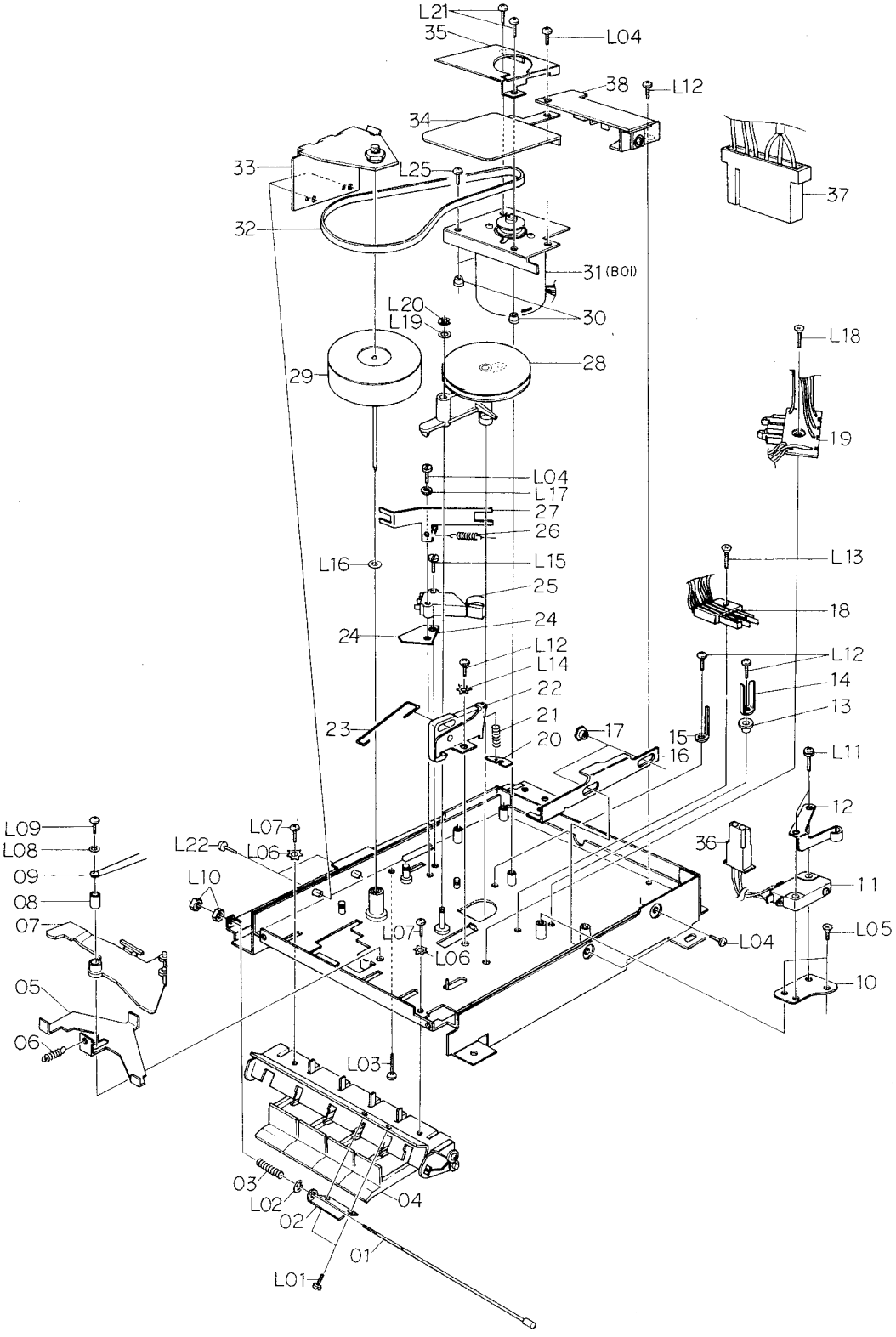


Fig. 9.5

Schematic Ref. No.	Part No.	Description	Q'ty
A05-1	CA03293A	Mechanism Ass'y 250	1
01	CA03291A	Eject Linkage Ass'y	1
02	0C03960A	Linkage Joint	1
03	0C03958A	Linkage Spring	1
04	CA03286A	Buttom Bracket Ass'y	1
05	0C03647B	See-Saw Arm	1
06	0C03649A	See-Saw Arm Spring	1
07	0C03646A	FRP Lever (B)	1
08	0C03648A	See-Saw Arm Pipe	1
09	0C03650B	Lever Spring	1
10	0C03962A	Play SW. Plate	1
11	0B07115A	Play SW.	1
12	0C03964A	Play SW, Actuater	1
13	0C03546A	Record Lock Shaft	1
14	0B03067A	Bind Holder	1
15	0C03591A	Cord Holder	1
16	0C03961A	Play SW. Slide Plate	1
17	0C03963A	Slide Center	1
18	CA03141A	Mute Switch Ass'y	1
19	CA03231A	Start Switch (C) Ass'y	1
20	0C03644A	Spring Stopper	1
21	0C03552B	Eject Spring	1
22	CA03118A	Eject Arm Ass'y	1
23	0C03553A	Eject Linkage Wire	1
24	0C03800A	Pause Switch Mylar	1
25	0C03743A	Pause Switch	1
26	0C03718A	Earth Spring (C)	1
27	0C03799E	Belt Guide	1
28	CA03150A	Idler Pulley Ass'y	1
29	CA03225A	Flywheel (B) Ass'y	1
30	0C03805B	Stud Collar (B)	3
31	CA03253B	MHX Motor Ass'y (B)	1
32	0C03668A	Driving Belt	1
33	CA03226A	Flywheel Holder (C) Ass'y	1
34	0C03859A	Shield Plate	1
35	0C03814D	Motor Shield	1
36	0B08223A	2P Mini-Connector Plug	1
37	0B08203A	6P Mini-Connector Plug	1
38	0B08204A	MHX Governer Ass'y (B)	1
L01	0E00166A	Screw M2x4 Cylinder Head	2
L02	0E00042A	E Ring 1.5mm	1
L03	0E00218A	Screw M2x10 Cylinder Head	1
L04	0E00219A	Screw M2.6x5 Philips Pan Head	2
L05	0E00076A	Screw M2x4 Philps Countersunk Head	2
L06	0E00172A	Washer 3mm Toothed Lock	2
L07	0E00509A	Screw M3x6 Philips Pan Head	2
L08	0E00142A	Washer 2.6mm	1
L09	0E00229A	Screw M2.6x10 Philips Pan Head	1
L10	0E00176A	Nut Hex M2	2
L11	0E00704A	Screw M3x14 Philips Pan Head (2A)	2
L12	0E00228A	Screw M2.6x6 Philips Pan Head (FT)	4
L13	0E00008A	Screw M2.6x8 Philips Countersunk Head	1
L14	0E00233A	Washer 2.6mm Toothed Lock	1
L15	0E00004A	Screw M2x8 Cylinder Head	1
L16	0C03174A	Washer 2.1mm Plastics	1
L17	0E00025A	Washer 2mm Spring	1
L18	0E00223A	Screw M2x10 Philips Countersunk Head	1
L19	0E00254A	Washer 3.1mm Plastics	1
L20	0E00222A	E Ring 2mm	1
L21	0E00220A	Screw M2.6x8 Philips Pan Head	2
L22	0E00226A	Screw M2.6x4 Philips Pan Head	2

9.5.2. Mechanism Ass'y 250 (A05-2)

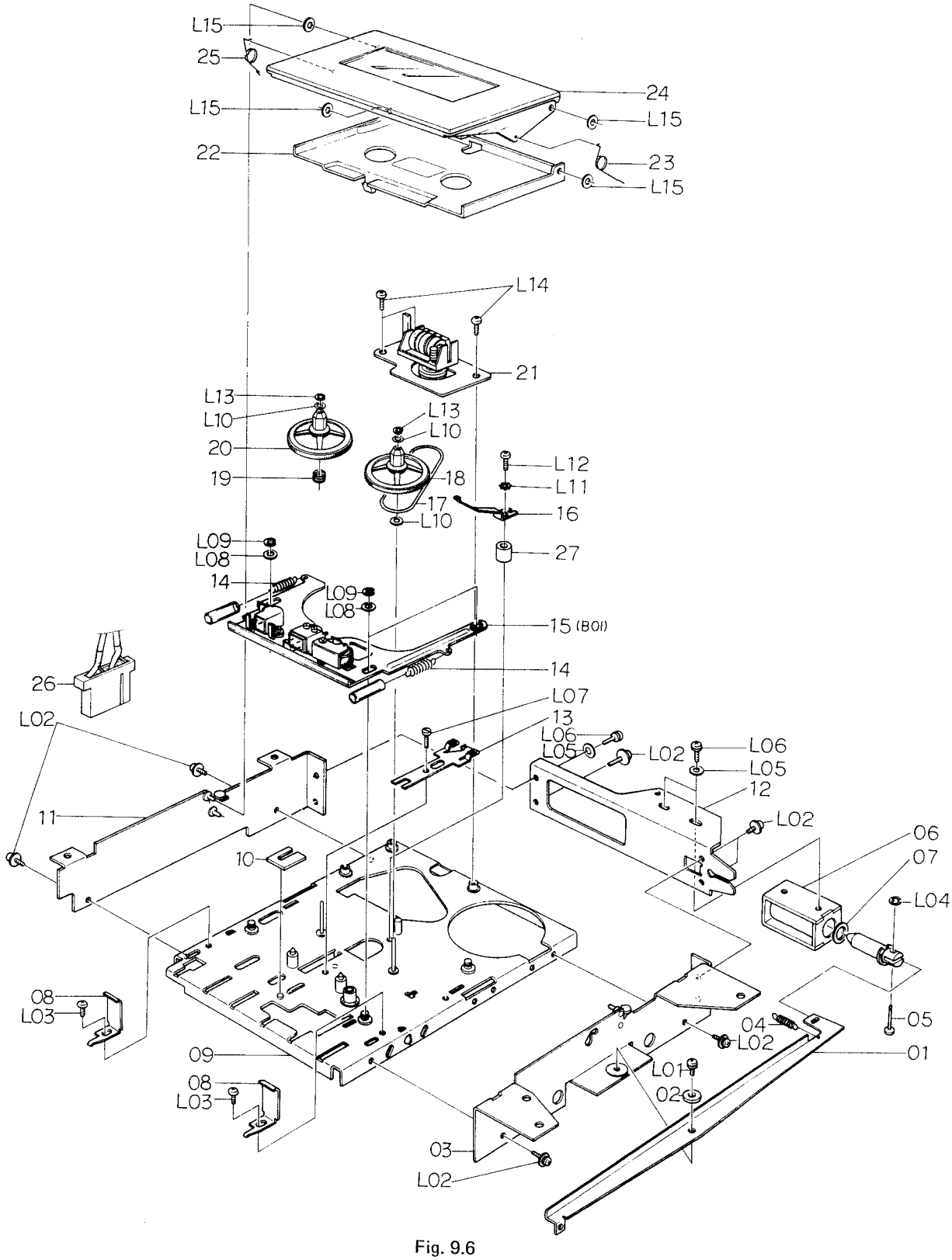


Fig. 9.6

Schematic Ref. No.	Part No.	Description	Q'ty
A05-2	CA03293A	**Mechanism Ass'y 250**	1
01	0C03954A	Solenoid Arm	1
02	0C03955A	Solenoid Arm Center	1
03	CA03290A	Mechanism Bracket R Ass'y	1
04	0C03957A	Solenoid Arm Spring	1
05	0C03906A	Solenoid Pin	1
06	0B08092A	Solenoid	1
07	0B08099A	Solenoid Mylar	1
08	0J03220A	Cassette Guide C	2
09	CA03292A	Mechanism Chassis Ass'y D	1
10	0C03863A	Head Base Spacer	1
11	CA03288A	Mechanism Bracket L Ass'y	1
12	0C03953A	Solenoid Holder	1
13	CA03140A	Brake Ass'y	1
14	0C03694B	Base Return Spring	2
15	CA03216A	Head Base (C) Ass'y	1
16	0C03852A	Cassette Well Spring (C)	1
17	0C03651A	Counter Belt (E)	1
18	CA03193A	Reel Hub Ass'y (Take-up)	1
19	0C03612A	Back Tension Spring	1
20	CA03192A	Reel Hub Ass'y (Supply)	1
21	BA03767A	Shut-off P.C.B. Ass'y	1
22	CA03243A	Cassette Well Ass'y	1
23	0C03760D	Lid Spring R	1
24	CA03283A	Cassette Lid Ass'y	1
25	0C03759D	Lid Spring L	1
26	0B08170A	4P Mini-connector Plug	1
27	0C03706A	Well Spring Stud	1
L01	0E00510A	Screw M3x8 Philips Pan Head (2A)	1
L02	0E00606A	Screw M3x6 Philips Pan Head (3A)	7
L03	0E00226A	Screw M2.6x4 Philips Pan Head	2
L04	0E00222A	E Ring 2mm	1
L05	0E00030A	Washer 3mm Steel	3
L06	0E00622A	Screw M3x5 Philips Pan Head (2A)	3
L07	0E00166A	Screw M2x4 Cylinder Head	1
L08	0C06243A	W4-8-0.2F	3
L09	0E00181A	E Ring 3mm	3
L10	0C03613A	Washer 1.6mm Plastics	3
L11	0E00233A	Washer 2.6mm Toothed Lock	1
L12	0E00231A	Screw M2.6x8 Philips Pan Head (FT)	1
L13	0E00165A	E Ring 1.2mm	2
L14	0E00219A	Screw M2.6x5 Philips Pan Head	3
L15	0E00254A	Washer 3.1mm Plastics	4

9.6. Head Base Ass'y 250 (B01)

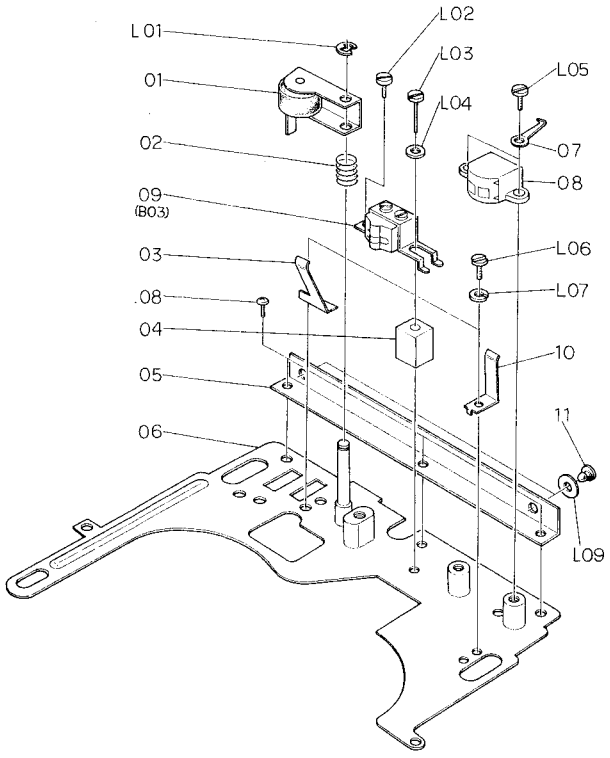


Fig. 9.7

9.7. MHX Motor Ass'y (B02)

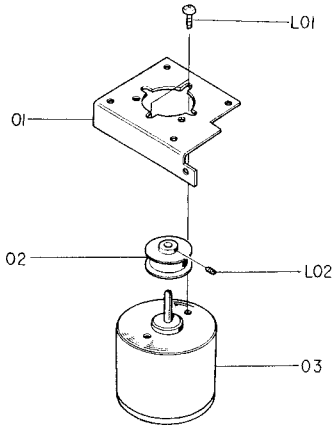


Fig. 9.8

9.8. Playback Head Ass'y (B03)

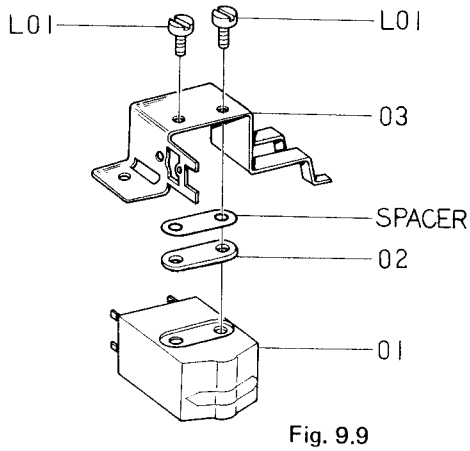


Fig. 9.9

Schematic Ref. No.	Part No.	Description	Q'ty
B01	**CA03285A**	**Head Base Ass'y 250**	1
01	CA03159B	Pressure Roller (B) Ass'y	1
02	0C03758B	Pressure Roller Spring (B)	1
03	0C03691A	Cassette Retainer Spring R	1
04	0C03588A	Azimuth Adjust Rubber	1
05	0C03692D	Base Angle	1
06	CA03217A	Head Base (C) Sub Ass'y	1
07	0C03591A	Cord Holder	2
08	0C03862A	Erase Head	1
09	CA03201B	Record/Playback Head Ass'y	1
10	0C03690A	Cassette Retainer Spring L	1
11	0C03767A	Base Stopper Rubber	2
L01	0E00042A	E Ring 1.5mm	1
L02	0E00166A	Screw M2x4 Cylinder Head	1
L03	0E00218A	Screw M2x10 Cylinder Head	1
L04	0E00149A	Washer 2.3mm	1
L05	0E00185A	Screw M2x6 Cylinder Head	2
L06	0E00002A	Screw M2x3 Cylinder Head	2
L07	0E00025A	Washer 2mm Spring	2
L08	0E00120A	Screw M2.6x3 Philips Pan Head	3
L09	0E00030A	Washer 3mm Steel	2
B02	**CA03253B**	**MHX Motor Ass'y**	1
01	0J03221A	Motor Bracket (C)	1
02	0C03770A	Motor Pulley JA	1
03	0C03950A	MHX Motor (B)	1
L01	0E00120A	Screw M2x3 Philips Pan Head	2
L02	0E00224A	Screw M2x3 Cone Point	1
B03	**CA03207B**	**Record/Playback Head Ass'y**	1
01	GA02009L	RP-52 Record/Playback Head	1
02	0G01100B	Head Hold Spacer	1
03	0G01099C	Head Holder (B)	1
L01	0E00002A	Screw M2x3 Cylinder Head	2
	AH01115A	PH Spacer t = 0.1mm	
	AH01116A	PH Spacer t = 0.15mm	
	AH01117A	PH Spacer t = 0.2mm	
	AH01118A	PH Spacer t = 0.25mm	
	AH01119A	PH Spacer t = 0.3mm	

10. ACCESSORIES

10.1. Holder Ass'y

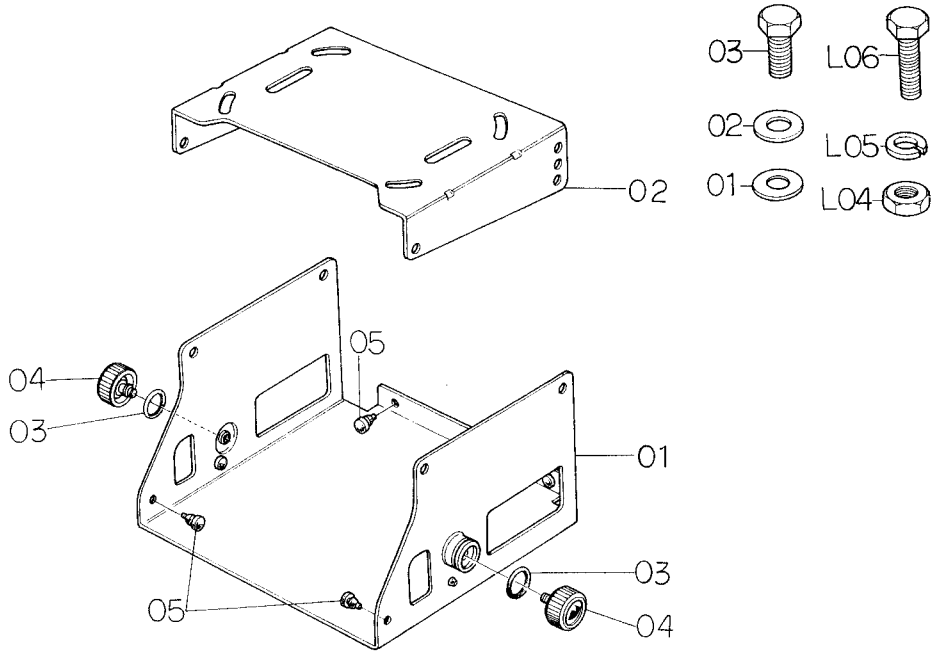


Fig. 10.1

10.2. ADS Cord Ass'y

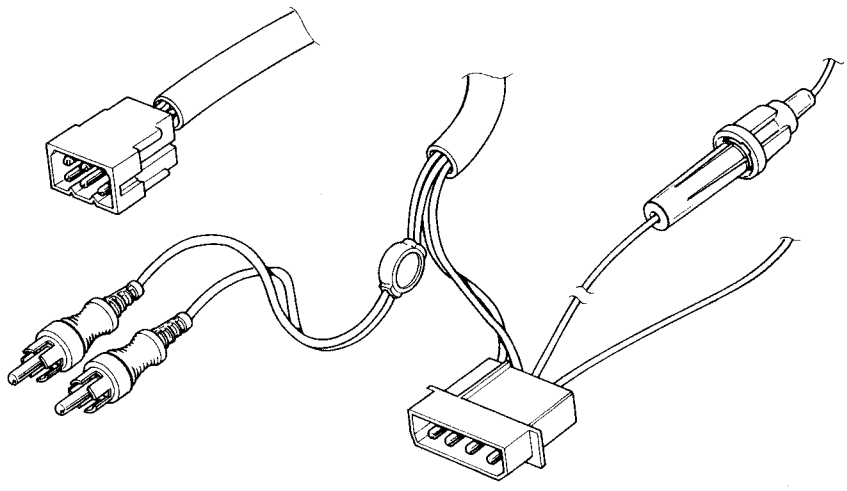


Fig. 10.2

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
	DA03187A	**Holder Ass'y**	1	L03	0E00706A	Bolt Hex M5x10	4
				L04	0E00708A	Nut Hex M5	10
01	DA03185A	Holder Sub Ass'y	1	L05	0E00709A	Washer 5mm Spring	12
02	0D03290A	Hanger	1	L06	0E00707A	Bolt Hex M5x16	6
03	0D03295A	Gum Ring	2				
04	DA03186A	Holder Knob Ass'y	2		**DA03196A**	**ADS Cord Ass'y** (NOTE: 0B08213U Fuse 6A)	1
05	0C03767A	Base Stopper	6				
L01	0E00711A	Washer 5mm Plastics	8				
L02	0E00710A	Washer 5mm	12				

11. BLOCK DIAGRAM

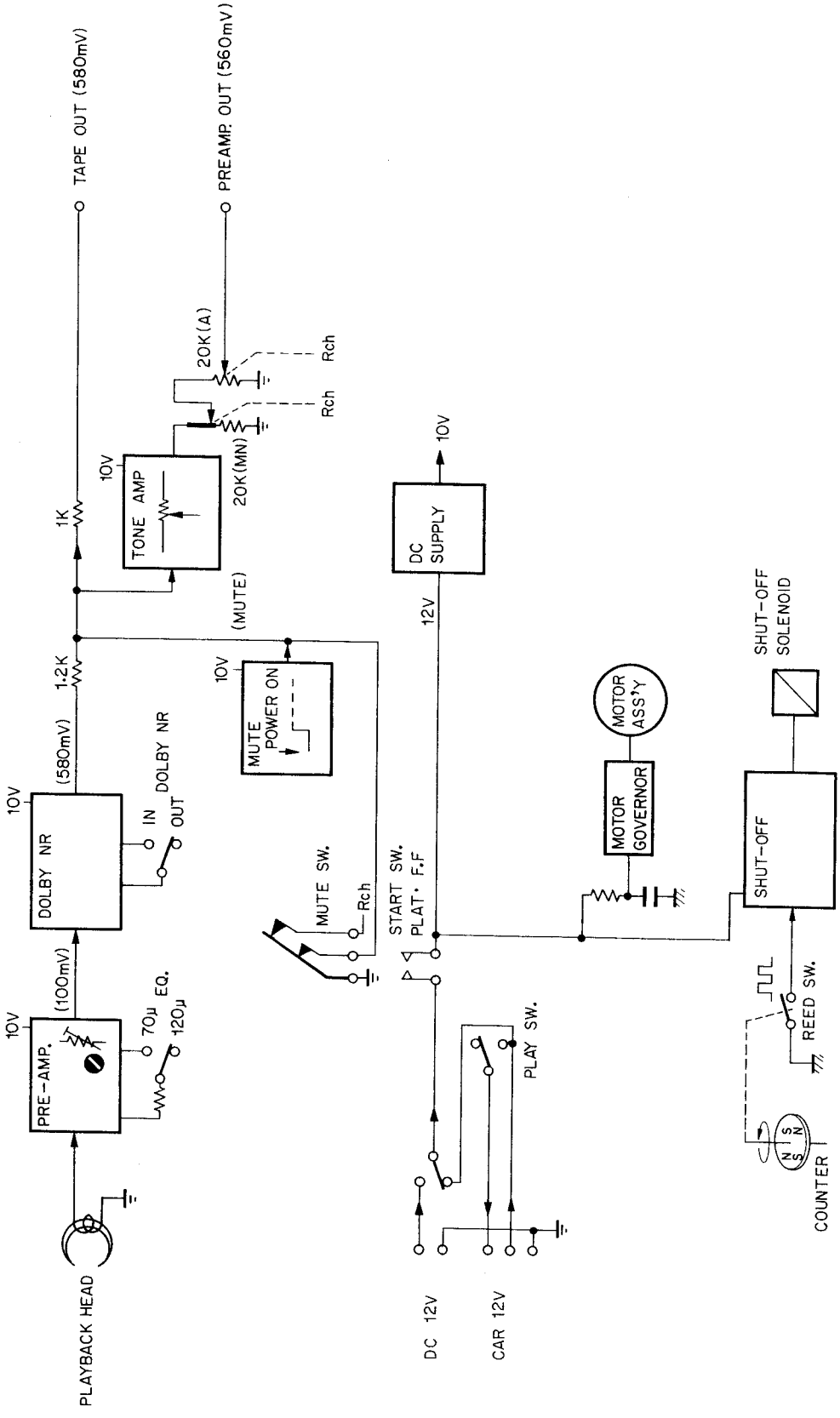


Fig. 11

12. SCHEMATIC DIAGRAM

12.1. Amplifier

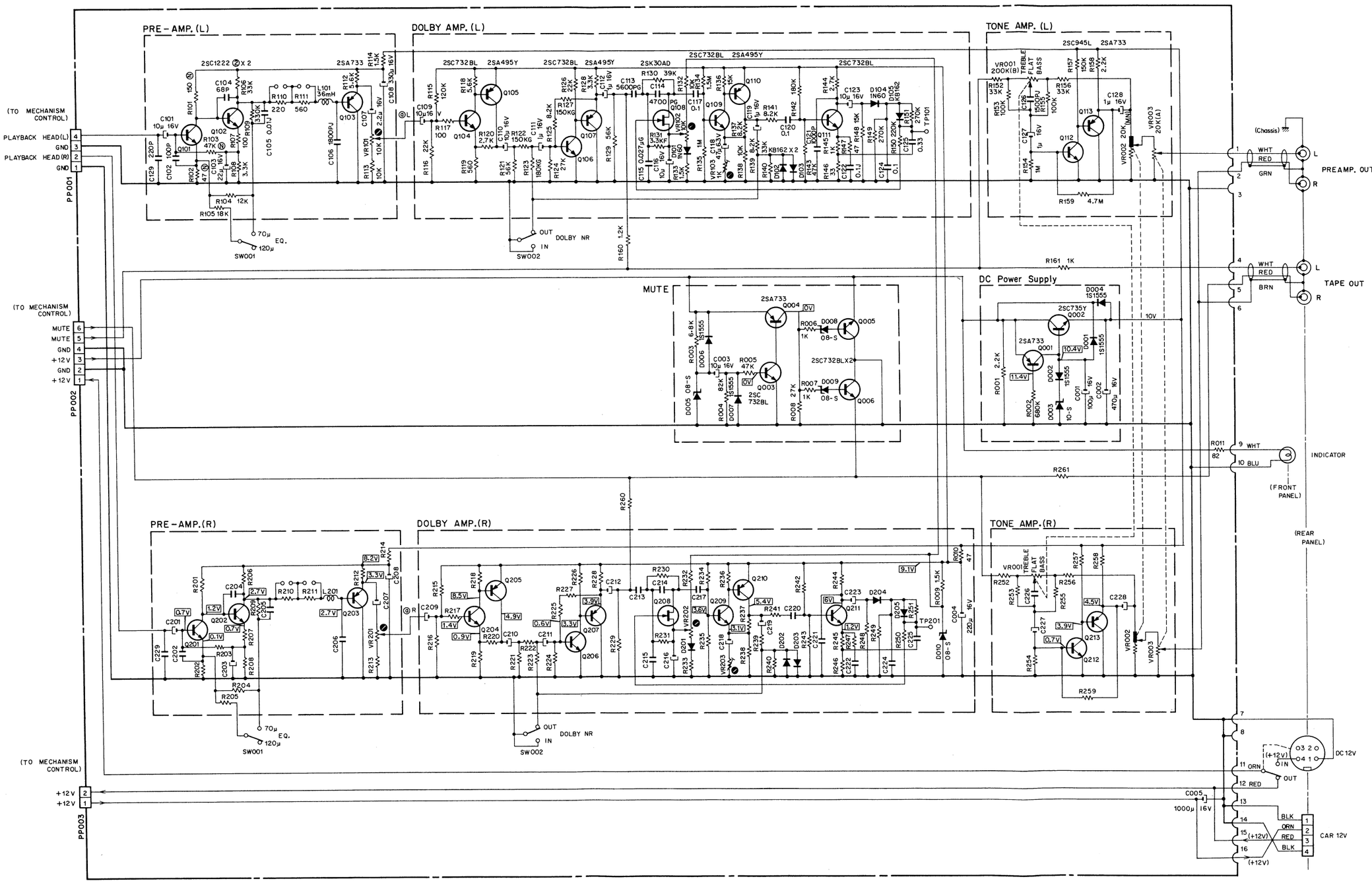


Fig. 12.1

12.2. Mechanism

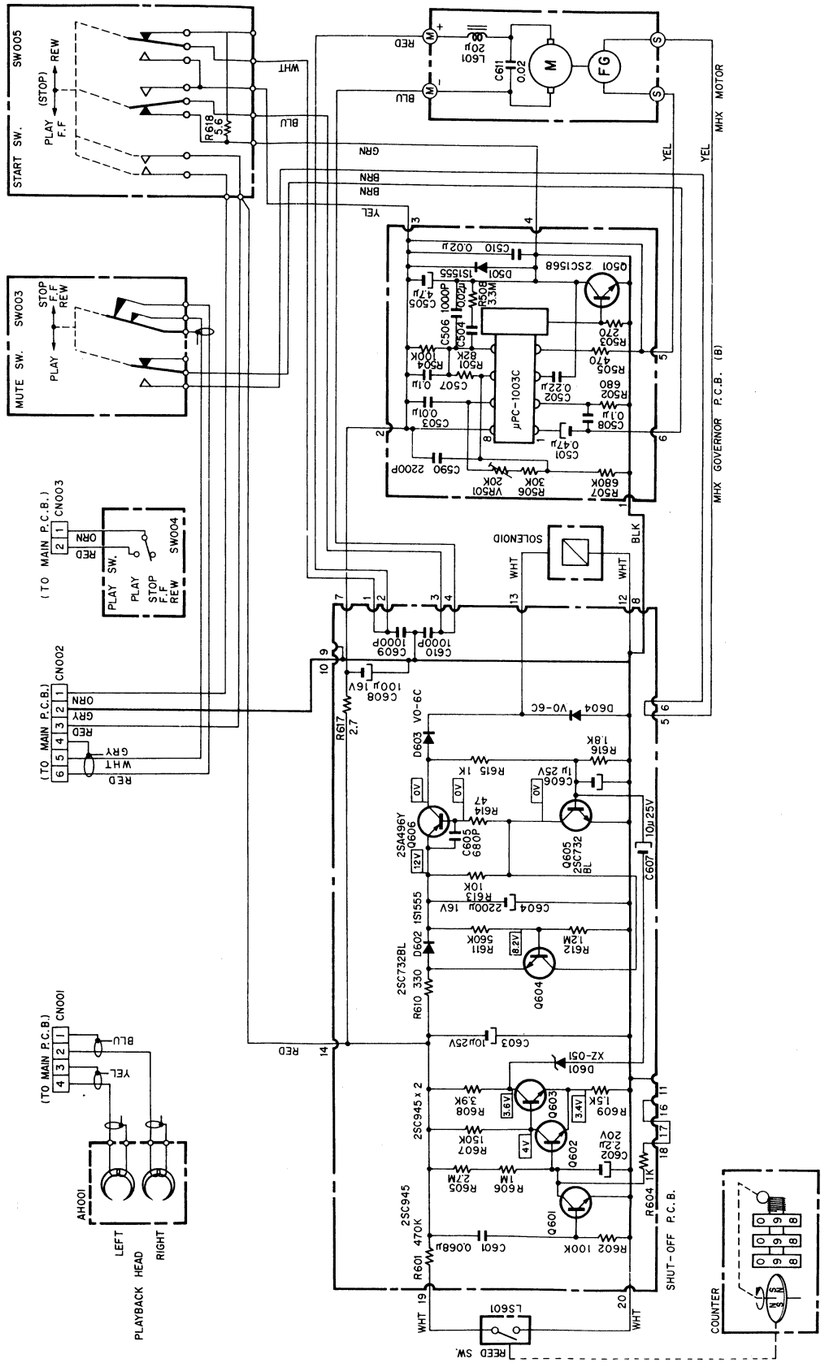


Fig. 12.2

13. SPECIFICATIONS

Power Supply	DC 12V (AC with AC adaptor)
Tape Speed	1-7/8 ips ±1.5%
Wow Flutter	Less than 0.13% (DIN WTD Peak)
Frequency Response	40–17,000Hz ±3dB (Nakamichi Test Tape)
Signal to Noise Ratio	Better than 62dB (Dolby NR In Wrms CCITT SX Tape)
Channel Separation	Better than 35dB
Cross Talk	Better than 60dB
Output	580mV (400Hz 200nWb/m, Volume at Max.)
Size	7-1/3"(W) x 3-1/2"(H) x 9-1/2"(D) 186m/m(W) x 90m/m(H) x 242m/m(D)
Weight	6-2/5 lbs (2.9 kg)

* Specifications and appearance design are subject to change for further improvement without notice.
* Dolby NR under license from Dolby Laboratories Inc.
* The word "DOLBY NR" and the Double-D-Symbol are trademarks of Dolby Laboratories Inc.

14. TROUBLE SHOOTING

14.1 Note

(1) Check to insure whether the output 10V (approximately) of the power supply is correct.
(2) When Flywheel is replaced, clean the Capstan before start of the operation (with alcohol-dipped cloth).

14.2 Trouble Shooting

14.2.1. Motor does not rotate:

(1) Defective Motor
(2) Defective Motor Governor.
(3) Defective Start Switch Ass'y.
(4) Defective Mute Switch Ass'y.
(5) Wire between Motor and Motor Governor is cut.
(6) Wire between Motor Governor and Start Switch Ass'y is cut, etc.
(7) 12V is not being supplied to the Motor Governor.

14.2.2. No power transmission:

(1) Defective Power Switch (inside of Mechanism).
(2) Defective DC supply block.
(3) Defective Power Connectors.

14.2.3. Sound is distorted :

(1) Playback Head is dirty.
(2) Defective cassette tape.
(3) Playback Head is magnetized.
(4) Defective Playback Head.

14.2.4. High Frequency is deteriorated

(1) Incorrect adjustment of Playback Head azimuth.
(2) Playback Head is dirty.
(3) Playback Head is magnetized.
(4) Excessive Wow/Flutter.
(5) Inaccurate tape travel.
(6) Defective Playback Head.
(7) Defective cassette tape.

14.2.5. Does not playback :

(1) Playback Head is dirty.
(2) Playback Head is defective (open circuit or short circuit).
(3) Defective Playback Amplifier.
(4) Mute is not released.
(5) Defective Mute Switch.
(6) Defective Dolby N.R. Circuit.
(7) Defective Output Buffer Amplifier.
(8) Defective Tape Output Jack.
(9) Wire between Playback Head and Playback Amplifier is cut.
(10) Defective Tone Amplifier.
(11) Inaccurate tape travel.
(12) Defective Preamp Output Jack.

14.2.6. Excessive Wow/Flutter:

(1) Defective Flywheel Ass'y.
(2) Defective Motor.
(3) Defective Motor Governor.
(4) Defective Drive Belt.
(5) Defective Pressure Roller Ass'y.
(6) Defective Idler Pulley Ass'y.
(7) Slippage between Pressure Roller and tape.
(8) No clearance between Flywheel Ass'y and Flywheel Holder Ass'y.
(9) Defective Cassette Tape (hard to rotate).
(10) Defective Tape Counter (hard to rotate or sticky, etc.).
(11) Excessive Back-tension
(12) Irregular Take-up Torque.

14.2.7. Auto Shut-off does not work at end of tape:

(1) Defective Auto Shut-off Detector.
(2) Defective Auto Shut-off Driver.
(3) Defective Solenoid Driver.
(4) Defective Deck Button (hard to operate).
(5) Wire between Solenoid and Driver is cut.
(6) Incorrect adjustment of Solenoid.

14.2.8. Auto Shut-off activates at position other than tape end:

(1) Defective Auto Shut-off Detector.
(2) Defective Auto Shut-off Driver.
(3) Defective Solenoid Driver.
(4) Defective Counter.
(5) Defective Counter Belt.
(6) Defective Cassette Tape (hard to rotate).

14.2.9. Defective tape travel :

(1) Playback Head is misaligned against Capstan.
(2) Pressure Roller is misaligned against Capstan.
(3) Excessive Take-up Torque.
(4) Pressure of Pressure Roller is weak.
(5) Dummy Head is misalinged against Capstan.
(6) Defective Capstan (bent, etc.).
(7) Defective Capstan Flange (bent, etc.)
(8) Reference Pin is bent.
(9) Head Base is bent.
(10) Incorrect adjustment of Playback Head position.
(11) Defective Dummy Head.
(12) Defective Pressure Roller.

14.2.10. Tape does not rotate:
(1) Defective Motor.
(2) Defective Motor Governor.
(3) Defective Drive Belt.
(4) Drive Belt is out of place.
(5) Defective Reel Hub.
(6) Defective cassette tape (hard to rotate).
(7) Incorrect loading of cassette tape.
(8) Pressure Roller is not in contact with Capstan.
(9) Defective Power Connectors.

14.2.11. Drive Belt is out of place:
(1) Motor is misaligned.
(2) Idler Pulley Ass'y is misaligned.
(3) Excessive clearance between Flywheel Ass'y and Flywheel Holder Ass'y.
(4) Defective Drive Belt.

14.2.12. Signal to Noise Ratio is deteriorated:
(1) Playback Head is magnetized.
(2) Playback Head is dirty.
(3) Defective Playback Head.
(4) Defective cassette tape.
(5) Defective Output Amplifier (noise is great).

14.2.13. Channel separation is deteriorated:
(1) Incorrect tape travel.
(2) Defective Playback Head.

14.2.14. Tape speed is too fast or slow:
(1) Defective Motor.
(2) Defective Motor Governor.
(3) Pressure Roller is not in contact with Capstan.
(4) Defective Mute Switch (contacting chassis).
(5) Defective cassette tape (hard to rotate).

14.2.15. Does not Eject:
(1) Defective Eject Linkage Arm.
(2) Defective Stop/Eject Button.
(3) Eject Linkage Arm is out of place.
(4) Defective cassette tape.

14.2.16. Level variations:
(1) Incorrect tape travel.
(2) Playback Head is dirty.
(3) Defective Playback Head.
(4) Playback Head is misaligned.
(5) Defective cassette tape.
(6) Incorrect adjustment of Head Base stroke.

14.3. Check method when parts are replaced.
When any part/part ass'y of the Nakamichi 250 is replaced with new one, please check to insure the following.

14.3.1. When Motor is replaced:
(1) Tape speed.
(2) Wow/Flutter.
(3) Drive Belt position (out of place).

14.3.2. When Drive Belt is replaced:
(1) Drive Belt position (out of place).
(2) Tape speed.
(3) Wow/Flutter.

14.3.3. When Playback Head is replaced:
(1) The inclination of a Playback head.
(2) Azimuth/Height.
(3) Tape Travelling.
(4) Playback output.
(5) Playback frequency response.
(6) Signal to Noise Ratio.

14.3.4. When Dummy Head is replaced:
(1) Tape travelling.
(2) Azimuth/Height (playback head).

14.3.5. When Flywheel Ass'y is replaced:
(1) Clearance between Flywheel and Flywheel Holder.
(2) Tape travelling.
(3) Azimuth/Height.
(4) Tape speed.

14.3.6. When Pressure Roller is replaced:
(1) Tape travelling.
(2) Azimuth/Height.
(3) Tape speed.
(4) Wow/Flutter.
(5) Pressure Roller timing.

14.3.7. When Tape Counter is replaced:
(1) Tape speed.
(2) Wow/Flutter.
(3) Counter check (sticky, etc.)
(4) Auto shut-off operation.

14.3.8. When Reel Hub Ass'y is replaced:
(1) Torque check (take-up, fastforward and/or rewind).
(2) Tape speed.
(3) Wow/Flutter.

14.3.9. When Deck Button Ass'y is replaced:

(1) Button operation.
(2) Head base stroke.
(3) Mute switch operation.
(4) Start switch operation.

14.3.10. When Idler Pulley Ass'y is replaced:

(1) Drive Belt position (out of place).
(2) Tape speed.
(3) Wow/Flutter.
(4) Rewind time.
(5) Fastforward time.
(6) Brake Timing.

14.3.11. When Motor Governor is replaced:

(1) Tape speed.
(2) Wow/Flutter.

14.3.12. When Solenoid is replaced:

(1) Solenoid position.